Definium™ 6000

Learning and Reference Guide

0459

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IMPORTANT!...X-RAY PROTECTION

X-Ray equipment if not properly used may cause injury. Accordingly the instructions herein contained should be thoroughly read and understood before you attempt to place this equipment in operation. The General Electric Company, Healthcare Division, will be glad to assist and cooperate in placing this equipment in use.

Although this apparatus incorporates a high degree of protection against x-radiation other than the useful beam, no practical design of equipment can provide complete protection. Nor can any practical design compel the operator or his assistant to take adequate precautions to prevent the possibility of authorized or unauthorized persons carelessly, unwisely, or unknowingly exposing themselves or others to direct or secondary radiation.

It is important that everyone having anything to do with x-radiation be fully acquainted with the recommendations of the National Council on Radiation Protection and Measurements as published in NCRP Reports available from NCRP Publications, 7910 Woodmont Ave., Bethesda, MD 20814, and of the International commission on Radiation Protection, and take adequate steps to insure protection against injury.

It is assumed that all persons authorized to use the equipment are cognizant of the danger of excessive exposure to x-radiation and the equipment is sold with the understanding that the General Electric Company, Medical Systems Division, its agents, and representatives have no responsibility for injury or damage which may result from exposure to x-radiation.

Various protective materials and devices are available. It is urged that such materials and devices be used.

If you have any comments, suggestions or corrections to the information in this document, please write them down, include the document title and document number, and send them to:

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CERTIFIED ELECTRICAL CONTRACTOR STATEMENT

All electrical installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. In addition, electrical feeds into the Power Distribution Unit shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations, and testing shall be performed by qualified GE Healthcare personnel. The products involved (and the accompanying electrical installations) are highly sophisticated, and special engineering competence is required. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE's electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE's field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

CAUTION: **This manual is prepared, approved in English, English version is the original version, manuals in any other language are translated by GE approved suppliers. Always refer to the English version if non-consistency is found.**

Medical Device Directive

This product complies with the following requirements when it bears the following CE marking of conformity:

Council Directive 93/42/EEC concerning medical devices :

CE 0459

The location of the CE mark label on the equipment is in the service system manual.

European registered place of business:

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Green QSD 1990 Standard issued by MDD (Medical Devices Directorate, Department of Health, UK).

Medical Device Good Manufacturing Practice Manual issued by the FDA (Food and Drug Administration, Department of Health, USA).

Underwriters' Laboratories, Inc. (UL), an independent testing laboratory.

Canadian Standards Association (CSA).

International Electrotechnical Commission (IEC), international standards organization, when applicable.

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Chapter 1

About This Guide

This chapter explains the purpose and design of this Learning and Reference Guide. It is an introduction to the guide, providing information on the purpose, prerequisite skills, guide organization, chapter format, and graphic conventions that identify the visual symbols used throughout the guide.

Topics covered include:

- *Safety Information*
- *Graphic Conventions and Legends*
- *Safety Notices*

Safety Information

Please refer to *Chapter 2: Safety and Regulatory* in this Learning and Reference Guide. The Safety chapter describes the safety information you and the physicians must understand thoroughly before you begin to use the system. Note that you will find additional safety information throughout your Learning and Reference Guide. If you need additional training, seek assistance from qualified GE Healthcare personnel. The equipment is intended for use by qualified personnel only. This guide should be kept with the equipment and be readily available at all times. It is important for you to periodically review the procedures and safety precautions. It is important for you to read and understand the contents of this guide before attempting to use this product.

Graphic Conventions and Legends

Table 1-1 describes the conventions used when working with menus, buttons, text boxes and keyboard keys.

Table 1-1 Conventions for menus, buttons, text boxes, and keyboard keys

Example	Describes
Select	• Marking an option in a group of check boxes or radial buttons • Choosing an option from a drop-down list • Activating a tab • Highlighting text • Highlighting row items
Press ENTER	Pressing a hard key on the keyboard.
Press CTRL+ALT+DELETE	Pressing a combination of keys on the keyboard. The key that should be pressed first is listed first.
Press and hold SHIFT	Pressing and holding down a hard key on the keyboard.
Click [START EXAM]	Clicking a button on a workstation screen.
In the **Matrix** text box,...	The name of text box in which you can select or type text or the name of a drop-down list from which you select an option.
Type **Supine** in the Patient Position text box (different font and bold)	Text you enter into a text box.
Select **Sort > Sort by date**	The pathway of selecting option(s) in a drop-down list.

Safety Notices

The following safety notices are used to emphasize certain safety instructions. This guide uses the international symbol along with the danger, warning, or caution message. This section also describes the purpose of a Note.

⚠

DANGER: **Danger is used to identify conditions or actions for which a specific hazard is known to exist which will cause severe personal injury, death, or substantial property damage if the instructions are ignored.**

⚠

WARNING: **Warning is used to identify conditions or actions for which a specific hazard is known to exist which may cause severe personal injury, death, or substantial property damage if the instructions are ignored.**

⚠

CAUTION: **Caution is used to identify conditions or actions for which a potential hazard may exist which will or can cause minor personal injury or property damage if the instructions are ignored.**

NOTE: A Note provides additional information that is helpful to you. It may emphasize certain information regarding special tools or techniques, items to check before proceeding, or factors to consider about a concept or task.

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Chapter 2

Safety and Regulatory

This chapter explains the safety considerations, general equipment and patient related precautions, and the symbols used for the safe operation of your equipment. This chapter also includes information about the emergency procedures.

This chapter presents the concepts necessary to successfully operate your system safely. Topics covered include:

- *Indications for Use*
- *Safety*
- *Know the Equipment*
- *Electromagnetic Compatibility*
- *Radiation Safety*
- *Emergency Procedures*
- *Safe Operation Precautions*
- *Symbols*
- *Identification and Compliance Plates*
- *Regulatory Requirements*
- *Dose Chart*
- *X-ray Source Assembly Filtration*

Indications for Use

The Definium 6000 is used to generate radiographic images of human anatomy. It is intended to replace radiographic film/screen systems in all general purpose diagnostic procedures for head, cervical part, thoracic part, abdomen, spine and extremities. It is applicable for all the patients who need any of these general purpose diagnostic procedures. This device is not intended for mammographic and dental applications.

⚠

WARNING: **It is forbidden to use this device to take exposure repeatly and frequently for a same patient, especially a child.**

WARNING: **It is forbidden to use this device for a pregnant woman.**

WARNING: **This system is fully motorized and free to move for patient positioning flexibility and productivity, never leave patient on the table or in the examination room unattended during your examination. Otherwise, injury to the patient may occur.**

Safety

The electrical wiring of the relevant rooms complies with all national and local codes, as well as the Regulations for the electrical equipment of buildings published by the Institution of Electrical Engineers. All assembly operations, extensions, re-adjustments, modifications, or repairs are carried out by GE Healthcare Technologies authorized service representatives. The equipment must be used in accordance with the instructions for use.

WARNING: **This X-Ray unit may be dangerous to patient and operator, unless safe exposure factors, operating instructions and maintenance schedules are observed.**

To be used by authorized personnel only.

WARNING: **Electric Shock Hazard! Do not remove covers or panels. The Acquisition Console and cabinets contain high voltage circuits for generating and controlling X-rays. Prevent possible electric shock by leaving covers or panels on the equipment. There are no operator serviceable parts or adjustments inside the cabinets. Only trained and qualified personnel should be permitted access to the internal parts of this equipment.**

WARNING: **Only GEHC validated equipment can be plugged into the interface in any part of this system. Leakage current requirements of non-validated equipment cannot be maintained with high confidence.**

⚠

WARNING: Never touch patient and any exposed extra low safety circuits or connectors simultaneously. electrical shock may occur.

⚠

WARNING: Workstation, display and any other non-medical electrical equipment used in this system shall only be connected to the system power distribution units. never supply electrical power directly from the wall outlet (mains outlet).

⚠

WARNING: Only table, wallstand,digital detector,overhead tube suspension and system cabinet which are specified to be installed in the examination room are suitable for use in patient environment. any other equipment or component specified to be installed in control room shall not be brought into and use in patient environment.

⚠

WARNING: Radiographic equipment must be operated by qualified personnel and only after sufficient training.

⚠

CAUTION: The Acquisition Console must be kept as vertical as possible to prevent over heating, which could damage the console. Do not place the console flat. Do not place any object on the console that could restrict air flow through the console.

⚠

CAUTION: Do not place any object on the cabinets that would restrict air flow from the top of the cabinet.

⚠

CAUTION: Always be alert to safety when you operate this equipment. You must be familiar enough with the equipment to recognize any malfunctions that can be a hazard. If a malfunction occurs or a safety problem is known to exist, do not use this equipment until qualified personnel correct the problem.

CAUTION: It is the User's responsibility to provide the means for audio and visual communication between the Operator and the patient.

Know the Equipment

Read and understand all of the instructions in this Learning and Reference Guide before attempting to use the product.

Equipment Classifications

The following equipment classifications are applicable to the product:

- Equipment classification with respect to protection from electric shock: Class I
- Degree of protection from electric shock: Type B
- Degree of protection against ingress of liquids: Not classified
- Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with nitrous oxide
- Mode of operation: Continuous operation with intermittent loading

Electromagnetic Compatibility

WARNING: This system is intended for use by healthcare professionals only. this system may cause radio interference or may disrupt the operation of nearby equipment. it may be necessary to take mitigation measures, such as re-orienting or relocating the system or shielding the location.

WARNING: This medial electrical equipment/system needs special precautions regarding emc and needs to be installed and put into service according to the emc information provided in the accompanying documents.

WARNING: Portable and mobile RF communications equipment can affect this medical electrical system. make sure those communication equipment are powered off before they are taken near this equipment / system.

WARNING: **Power line anomalies or electrostatic discharges in all equipment areas may cause the monitor image to become momentarily disrupted or to go to blank; the mouse and/or keyboard may become inoperable or an error may be displayed on the worklist or image viewer screens. the system may recover by itself or you may need to reboot the system. the system may shut itself down, and will require a reboot.**

WARNING: **A power surge during image transmission to the workstation after acquisition may cause the image to be lost. the system will operate normally after the power surge, but the image must be reacquired.**

WARNING: **Power line anomalies or electrostatic discharges to the system cause a CD write failure error. A new CD should be used and the image re-written.**

WARNING: **When trying to fix the monitor video loss or inoperable mouse issues, cycling the system power on/off may cause the monitor to display “can’t open boot device error” message. if so, contact ge healthcare service.**

WARNING: **If electromagnetic compliance is mandatory for the local country where this system is installed, this equipment is allowed to be installed only in x-ray protected rooms, which provide an attenuation of at least 12 dB for radio disturbances from 30 MHz to 1 GHz.**

Radiation Safety

Always use the proper technical factors for each procedure to minimize X-ray exposure and to produce the best diagnostic results. In particular, you must be thoroughly familiar with the safety precautions before operating this system. Default system techniques are recommended for AEC acquisition especially on Dual Energy studies. Default techniques are designed to optimize the image processing parameters.

CAUTION: Please protect the families and any other company of the patients' around this device from radiation. Please protect the technologists who is around this device from radiation.

CAUTION: Always use the proper technical factors for each procedure to minimize X-ray exposure and to produce the best diagnostic results. In particular, you must be thoroughly familiar with the safety precautions before operating this system. Default system techniques are recommended for AEC acquisition. Default techniques are designed to optimize the image processing parameters.

CAUTION: There should be no persons other than the patient in the exam room during x-ray exposure. If circumstances require another person to enter the room while x-ray exposures are planned or possible, that person should be well protected in accordance with accepted safety practices.

CAUTION: Tube assembly and collimator used in this system are verified to have a total filtration of 3.0 mmAl at least, whenever you replace one of them, make sure total filtration for this X-ray equipment is not less than3.0 mmAl.

CAUTION: Dimensions of current field of x-ray (FOV) and SID are provided on the product, make sure you are using the right field of x-ray for specific examination.

CAUTION: Make sure any other accessories or materials are not located in the primary X-ray beam during exposure, that result in a bad image quality.

CAUTION: Use the largest possible focal spot-to-skin distance appropriate for the anatomy being imaged, to keep the patient absorbed dose as small as possible.

CAUTION: **Always use protective devices and protective clothing for the patient, operator or even other persons as appropriate to the workload and examination involved.**

CAUTION: **Hospital is responsible to provide means for audio and visual communication between the operator and the patient.**

Emergency Procedures

It is not always possible to determine when some components, such as the X-ray tubes, are nearing the end of their operating lives. These components could stop operating during a patient examination. The facility must establish procedures for handling the patient in case of the loss of radiographic imaging or other system functions during an exam.

WARNING: **Do not use device should a safety problem occur and contact authorized service immediately.**

WARNING: **Push the emergency button on the product to stop power-driven motions should a hazard develop that may endanger the patient, operator or by-standers.**

WARNING: **In order to check Emergency Stop functionality, just actuate emergency stop button while moving the electrically driven parts, and make sure the motion stops immediately and it cannot be resumed unless you restore it deliberately.**

WARNING: **In case of non-stopped exposure, power supply shall be cut immediately to terminate exposures.**

Safe Operation Precautions

General Use Warnings

WARNING: Do not load non-system software onto the system computer, operating system may crash down causing data lost.

WARNING: If applicable, patient connected lines, tubes, etc. shall be long enough to allow full travel of the system and will not become pinched or pulled.

WARNING: Use of operation methods other than those specified herein may result in hazardous radiation exposure.

WARNING: For continued safe use of this equipment, follow the instructions contained in this Learning and Reference Guide. Study this guide carefully before using the equipment and keep it at hand for quick reference. It may be desirable for the facility to print this manual from a standard PC to have a hard copy available within the Radiology department.

WARNING: United States Federal Law restricts this device to use by or on the order of a physician.

WARNING: The table must be used only by qualified personnel and only after training in the specifics of these operations.

WARNING: Potential Pinch Point: Use table foot pedals with care when lowering the table. Clearance is limited next to the table side cover, and a pinch point may exist for the operator.

WARNING: It is the responsibility of the operator to ensure the safety of the patient at all times. When the table is in use the patient should be monitored by visual observation, use of proper patient positioning, and use of the protective devices provided.

WARNING: Thoroughly check that there is no interference or possibility of collision between the patient and other equipment.

WARNING: Perform periodic maintenance to ensure continued safe use of the equipment. Follow recommended preventative maintenance schedule as outlined in the GE Field Service Manual.

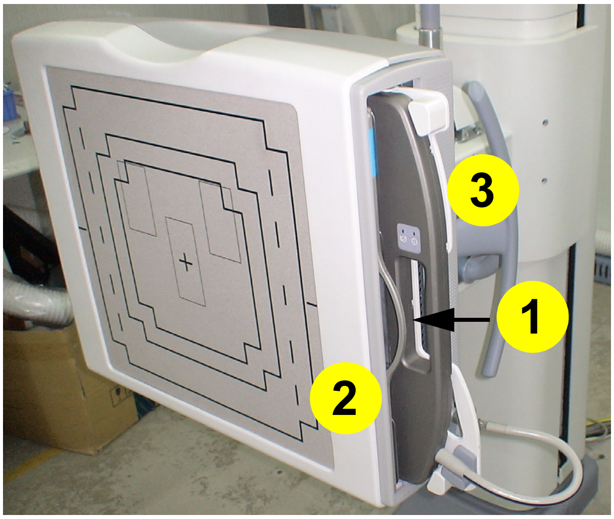
WARNING: Potential Pinch Point: Take care of the patients feet not under the foot pedal.

WARNING: Part of the circuit inside the system cabinet has dangerous voltages, so part of the electriferous circuits should be powered off by wall brake.

WARNING: Never exceed the rated load of patient handling devices.

WARNING: Potential Pinch Point: When inserting the grid into the slot, a potential finger pinch hazard is created when the grid is close to the final resting position. (Figure 2-1)

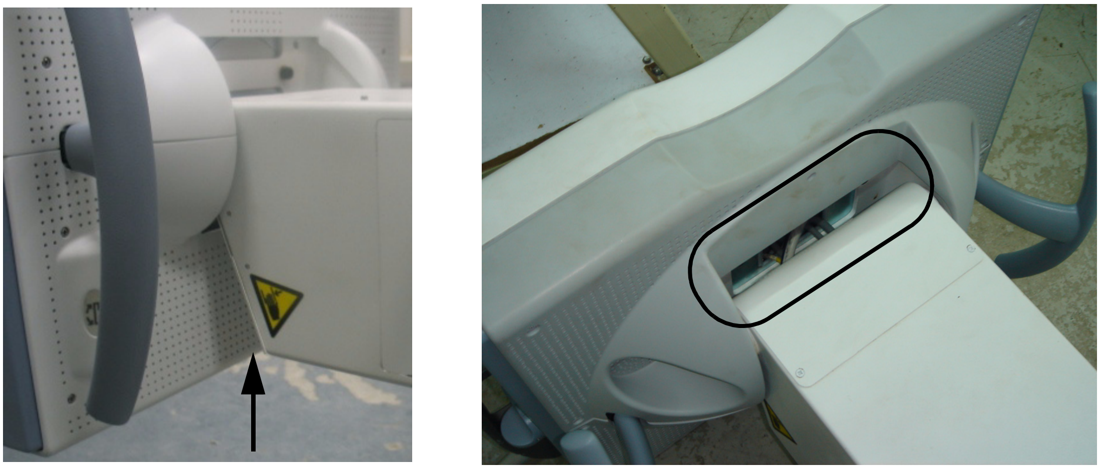
Figure 2-1 Potential pinch point



1. Potential Pinch Point
2. Grid
3. Wall Stand Detector

WARNING: **Potential Pinch Point : Be cautious to the potential pinch injuries during wall stand tilting.**

Figure 2-2 Potential pinch point



WARNING: **If the tube fan is rotating in high speed before system shutdown (obvious and sharp sound of the tube fan can be heard around the tube), please wait, until the tube fan is rotating in low speed (low and gentle sound of the tube fan can be heard around the tube), the system can be shutdown, or the tube will be damaged because of the sharp increase of tube's temperature.**

WARNING: Do not use device should a safety problem occur and contact authorized service immediately.

CAUTION: Always use GEHC recommended accessories to ensure best performance and to avoid possible hazards.

CAUTION: Alwary assist the patient during loading and unloading from table or wall stand.

CAUTION: Keep the patient in full view at all times and never leaves the patient unattended while on the table.

CAUTION: Please carefully monitor all equipment motions to prevent collisions. Attention shall be drawn during operation to prevent possible injuries that could resut from collision of the power-driven equipment parts with other moving or stationary items likely to be in the environment.

CAUTION: Please check for obstructions before moving the equipment; do not drive the equipment into or onto fixed objects.

Patient Positioning Warnings

WARNING: During patient procedures, ensure the patient's head, hands and feet are completely within the tabletop area. If any portion of the patient's body extends over the edge of the tabletop, serious injury may result.

⚠

WARNING: The maximum supported weight, with the tabletop fully extended toward the head or foot end of the table, is 200 kg (440 lb.) provided the patient is fully prostrate. Exceeding this limit may cause equipment damage or injury to the patient.

⚠

WARNING: Digital table is designed to remain stable under normal conditions, but when necessary for special patient loads and positioning, it will move when sufficient force is applied. If no longitudinal movement or if abnormal patient loading is required, modifications must be made to ensure the tabletop is locked longitudinally into position.

⚠

WARNING: Never let patient put limbs outside of tabletop area, serious injury could occur if patient is not attended properly. at the same time, operators shall also watch themselves for the moving parts on the table to avoid possible injury to fingers, hands, feet or any other parts of body structure.

⚠

WARNING: Always, watch all parts of the patient table to verify there is no interference or possibility of collision with the patient or with other equipment. The maximum patient weight supported with the table top fully extended towards the head or foot end is 180 kg evenly distributed over the surface of the tabletop. Exceeding this limit may cause injury to the patient or equipment damage. When moving the table, cautiously put hand on table top. DO NOT grasp table top side to drive table movement. Injury of operator or patient hands may occur.

⚠

WARNING: The OTS tracks to the wall stand receptor. Use caution when moving receptor in a small room configurations. Always be sure that the patient is clear of the OTS before selecting a wall stand configuration.

⚠

WARNING: During auto positioning, watch OTS motorized movement when patient or any other person is under OTS, never leave patient unattended during positioning for examination.

WARNING: The OTS is designed to remain stable under power on conditions. When power to the system is removed, the OTS is locked.

WARNING: OTS could automatically track the vertical moving of the Wall Stand dectector. Always make sure people are out of the movement area when you move Wall Stand detector vertically.

WARNING: Auto-positioning (if configured for your system) and Auto-tracking features are indended to enhance productivity. Always make sure people of any other objects are out of the movement area whenever you initiate those kind of operations, otherwise damage to equipment or injury to people could occur.

WARNING: The Wall Stand detector housing assembly could reach the floor for certain X-ray examinations. Special cares are required when you move it down to the floor level to avoid possible collisions with floor or any other objects or even human bodies. Otherwise, damage to this equipment or injury to people could occur.

WARNING: Tilting and vertical motion of the wall stand detector housing assembly is electrically powered (motorzied vertical motion is an optional feature). Always pay special attentions to avoid it to hit people.

WARNING: Wall stand detector housing assembly could automatically track the vertical motoion of OTS. Always make sure people are out of the movement area when you move OTS vertically.

WARNING: Always position wall stand detector assembly manually for minor adjust -ments when patients are positioned on it.

WARNING: Always remind people not to lean on the Wall Stand detector housing assembly for balance. The lateral bar and PA bars are not intended to support patients' weights for balance. The detector housing assembly could move suddenly and people could fall down due to out-of-balance.

Table Motion Warnings

WARNING: When the power to the table is off, the tabletop can move freely in longitudinal direction. To avoid injuries, monitor the tabletop movement.

WARNING: Prior to raising or lowering the tabletop, ensure there are no obstructions present, above or below.

WARNING: Before the patient gets on or off the tabletop, always press the Table Control Lock button. This momentarily blocks the foot pedal functions and avoids injuries to the patient or damage to the equipment if a control pedal is accidentally engaged.

WARNING: To avoid injury to fingers and hand do not allow the patient's or operator's fingers to be extended over the edges of the tabletop. Hands must be kept away from table top edges at all times.

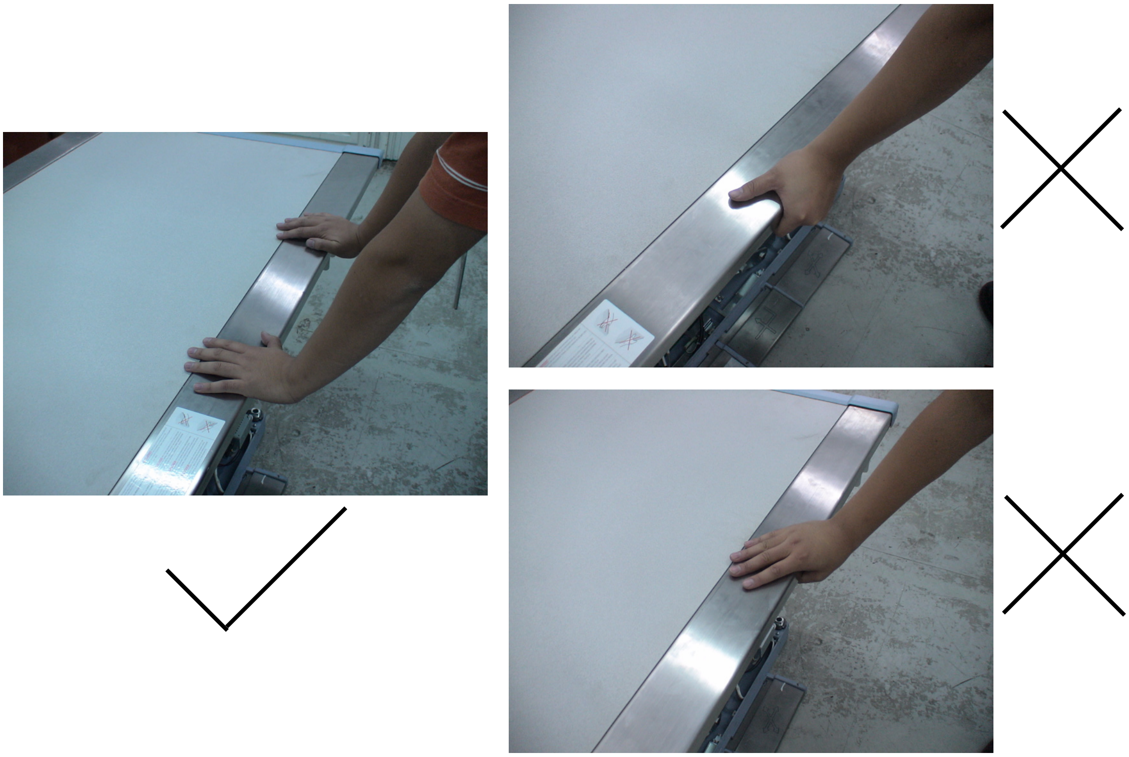
WARNING: Proper supporting and braking shall be taken if the child is required to stand on the table for any examination.

WARNING: When power to the patient table is cut off, the table top can move freely. When there is no power applied to the table, it is the responsibility of the operator to avoid injuries by monitoring table top movement.

WARNING: The longitudinal movement speeds up while table top loads patient. To avoid collision injury, please insure there is no other people in the field table top could reach.

DANGER: Potential Pinch Point: please carefully press the foot pedal to release the table top, to avoid table top finger pinch.

Figure 2-3 Potential pinch point



WARNING: Never put your foot or toe right underneath the descending table outer covers, and at the same time, make sure patients' or other people' foot or toe is also out of the hazardous areas. Otherwise injury could occur.

WARNING: The detector housing underneath the tabletop is a motorized part, and it will automatically move during homing or auto-tracking operation. Special attentions should be taken when you move the OTS longitudinally to ensure the moving housing will not hurt people.

⚠

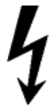
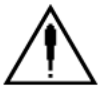
WARNING: **Never stretch arm or hand into the cavity underneath the tabletop which provide room for the moving detector housing. There is no operator serviceable parts there.**

Symbols

This section explains the symbols used on this system and in its accompanying documents.

Special Notices

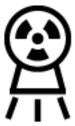
Table 2-2 Special notices

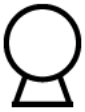
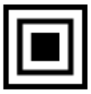
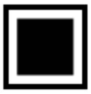
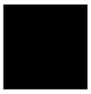
Symbol	Description
	Dangerous voltage. This indicates an avoidable, dangerous, high voltage hazard.
	This symbol on the equipment indicates the operating instructions should be consulted to assure safe operation.

X-ray Tube

Table 2-3 describes the operational symbols for the system such as X-ray emissions and collimator locations.

Table 2-3 Operational symbols

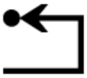
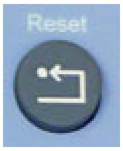
Symbol	Description
	X-ray emission is used to indicate the X-ray tube head is emitting X-rays. Take adequate precautions to prevent the possibility of any persons carelessly, unwisely, or unknowingly exposing themselves or others to radiation.

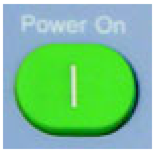
Symbol	Description
	X-ray source assembly is used to indicate a reference to an X-ray source assembly.
	Identifies controls or indicators associated with the selection of a small focal spot or the connection for the corresponding filament.
	Identifies controls or indicators associated with the selection of focal spot or the connection for the corresponding filament. When used with the small focal spot symbol, this symbol applies to the larger focal spot. When used with the large focal spot symbol, this symbol applies to the smaller focal spot.
	Identifies controls or indicators associated with the selection of a large focal spot or the connection for the corresponding filament.

Power ON and OFF

Table 2-4 describes the power controls of the system, located on the RCIM (II).

Table 2-4 Power controls

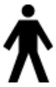
Symbol	Description
 	A gray SYSTEM RESET button is used to reset the system. The button is located on the RCIM(II).

Symbol	Description
⏽ 	A green POWER ON button is used to turn on the power to the system. The button is located on the RCIM(II).

Electrical Type

Table 2-5 describes the electrical protection rating based on system type.

Table 2-5 Electrical type

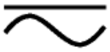
Symbol	Description
	Type B Equipment indicates the equipment provides a particular degree of protection against electrical shock regarding leakage current and protective earthing per IEC60601-1.

Electrical Current

Table 2-6 describes the symbols for the different types of electrical current that may be used on your system.

Table 2-6 Electrical current types

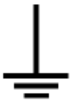
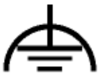
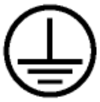
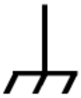
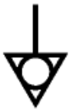
Symbol	Description
∿	Alternating Current indicates the equipment is suitable for alternating current only.
⎓	Direct Current indicates the equipment is suitable for direct current only.

Symbol	Description
	Both direct and alternating currents indicate the equipment is suitable for both direct and alternating current.

Ground

Table 2-7 describes the different types of grounding used in your system.

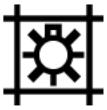
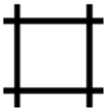
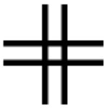
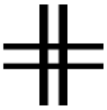
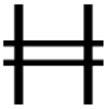
Table 2-7 Ground types

Symbol	Description
	Functional Earth (ground) Terminal indicates a terminal directly connected to a point of a measuring supply or control circuit or to a screening part, which is intended to be earthed for functional purposes.
	Noiseless (clean) earth (ground) identifies any terminal of a specially designed earthing system where noise from earth of leads will not cause a malfunction of the equipment.
	Protective earth (ground) identifies any terminal which is intended for connection of an external protective conductor to protect against electrical shock in case of a fault.
	Frame or chassis identify the frame or chassis terminal.
	Equipotentiality identifies terminals that bring the various parts of equipment or systems to the same potential when connected together. These terminals are not necessarily at earth (ground) potential. The value of the potential may be indicated next to the symbol.

Collimator

Table 2-8 describes the collimator controls and the radiation field.

Table 2-8 Collimator descriptions

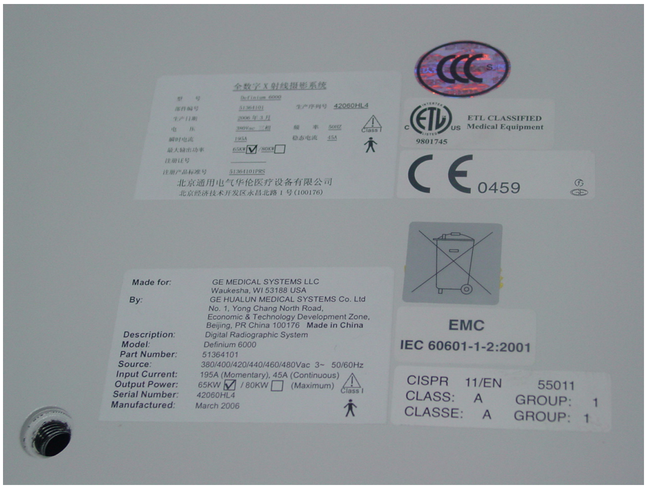
Symbol	Description
	Control for indicating radiation field by using light.
	Identifies controls for opening the collimator blades, or indicates partially or fully open state.
	Identifies controls for closing the collimator blades, or indicates closed state.
	Indicates the collimator blades are closed. The controlled blades are shown in thicker lines.
	Indicates the collimator blades are open. The controlled blades are shown in thicker lines.

Identification and Compliance Plates

Product identification labels can be found on the tops and sides of the cabinets, the rear of monitors, and other exterior surfaces on the equipment. The types of system identification compliance plates are located in Table 2-9.

Identification Plate

Figure 2-4 System on cabinet



北京通用电气华伦医疗设备有限公司
北京经济技术开发区永昌北路 1 号 (100176)

Made for: GE MEDICAL SYSTEMS LLC
Waukesha, WI 53188 USA
By: GE HUALUN MEDICAL SYSTEMS Co. Ltd
No. 1, Yong Chang North Road,
Economic & Technology Development Zone,
Beijing, PR China 100176 **Made in China**
Description: Digital Radiographic System
Model: Definium 6000
Part Number: 51364101
Source: 380/400/420/440/460/480Vac 3~ 50/60Hz
Input Current: 195A (Momentary), 45A (Continuous)
Output Power: 65KW ☑ / 80KW ☐ (Maximum)
Serial Number: 42060HL4
Manufactured: March 2006

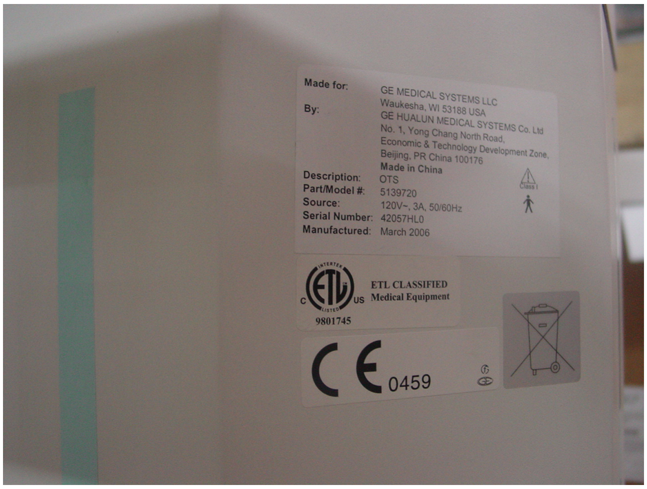
ETL CLASSIFIED Medical Equipment
9801745

0459

EMC
IEC 60601-1-2:2001

CISPR 11/EN 55011
CLASS: A GROUP: 1
CLASSE: A GROUP: 1

Figure 2-5 OTS

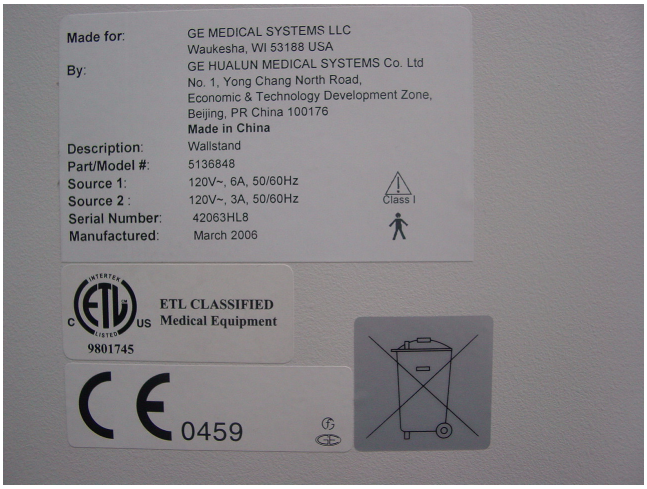


Made for: GE MEDICAL SYSTEMS LLC
Waukesha, WI 53188 USA
By: GE HUALUN MEDICAL SYSTEMS Co. Ltd
No. 1, Yong Chang North Road,
Economic & Technology Development Zone,
Beijing, PR China 100176
Made in China
Description: OTS
Part/Model #: 5139720
Source: 120V~, 3A, 50/60Hz
Serial Number: 42057HL0
Manufactured: March 2006

ETL CLASSIFIED Medical Equipment
9801745

0459

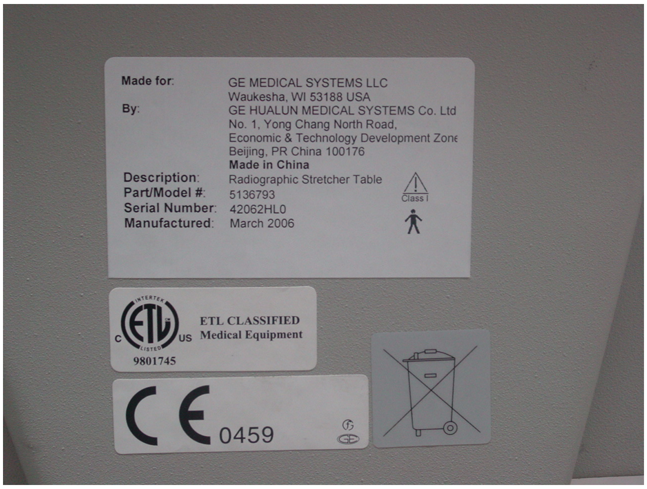
Figure 2-6 Wall Stand



Made for:	GE MEDICAL SYSTEMS LLC Waukesha, WI 53188 USA
By:	GE HUALUN MEDICAL SYSTEMS Co. Ltd No. 1, Yong Chang North Road, Economic & Technology Development Zone, Beijing, PR China 100176 **Made in China**
Description:	Wallstand
Part/Model #:	5136848
Source 1:	120V~, 6A, 50/60Hz
Source 2 :	120V~, 3A, 50/60Hz
Serial Number:	42063HL8
Manufactured:	March 2006

ETL CLASSIFIED
Medical Equipment
9801745

Figure 2-7 Digital Table or Stretcher



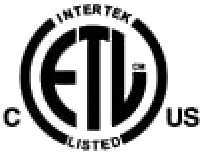
Made for:	GE MEDICAL SYSTEMS LLC Waukesha, WI 53188 USA
By:	GE HUALUN MEDICAL SYSTEMS Co. Ltd No. 1, Yong Chang North Road, Economic & Technology Development Zone Beijing, PR China 100176 **Made in China**
Description:	Radiographic Stretcher Table
Part/Model #:	5136793
Serial Number:	42062HL0
Manufactured:	March 2006

ETL CLASSIFIED
Medical Equipment
9801745

NRTL Listed Label

The Nationally Recognized Testing Laboratory (NRTL) label indicates that the assembly is listed or recognized by a nationally recognized testing laboratory (i.e. ETL, UL, CSA).

Figure 2-8 ETL Listed Label



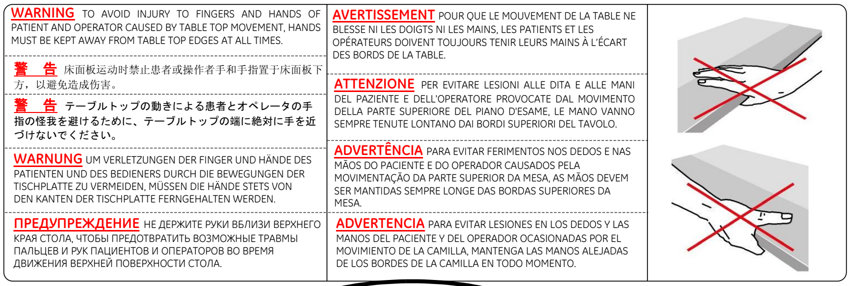
Identification and Compliance Plate Locations

Table 2-9 identifies the type of compliance plates and their location on your system.

Table 2-9 System identification and compliance plates

Component	Plate Type
OTS Suspension X-ray MX 100 X-ray Tube Casing	Identification, HHS, CE, NRTL
Radiology Console Interface Module (RCIM(II))	Identification, HHS, NRTL
Acquisition Workstation	Identification, NRTL
Table	Identification, CE, NRTL
Collimator	Identification, HHS, CE, NRTL
Wall stand	Identification, CE, NRTL
Flat Panel Monitor	Identification, NRTL, CE
System Cabinet	Identification, NRTL
Jedi Generator	Identification, HHS, NRTL, IEC

Table Top Finger-Pinch Warning Labels (2)



WARNING TO AVOID INJURY TO FINGERS AND HANDS OF PATIENT AND OPERATOR CAUSED BY TABLE TOP MOVEMENT, HANDS MUST BE KEPT AWAY FROM TABLE TOP EDGES AT ALL TIMES.

警　告 床面板运动时禁止患者或操作者手和手指置于床面板下方，以避免造成伤害。

警　告 テーブルトップの動きによる患者とオペレータの手指の怪我を避けるために、テーブルトップの端に絶対に手を近づけないでください。

WARNUNG UM VERLETZUNGEN DER FINGER UND HÄNDE DES PATIENTEN UND DES BEDIENERS DURCH DIE BEWEGUNGEN DER TISCHPLATTE ZU VERMEIDEN, MÜSSEN DIE HÄNDE STETS VON DEN KANTEN DER TISCHPLATTE FERNGEHALTEN WERDEN.

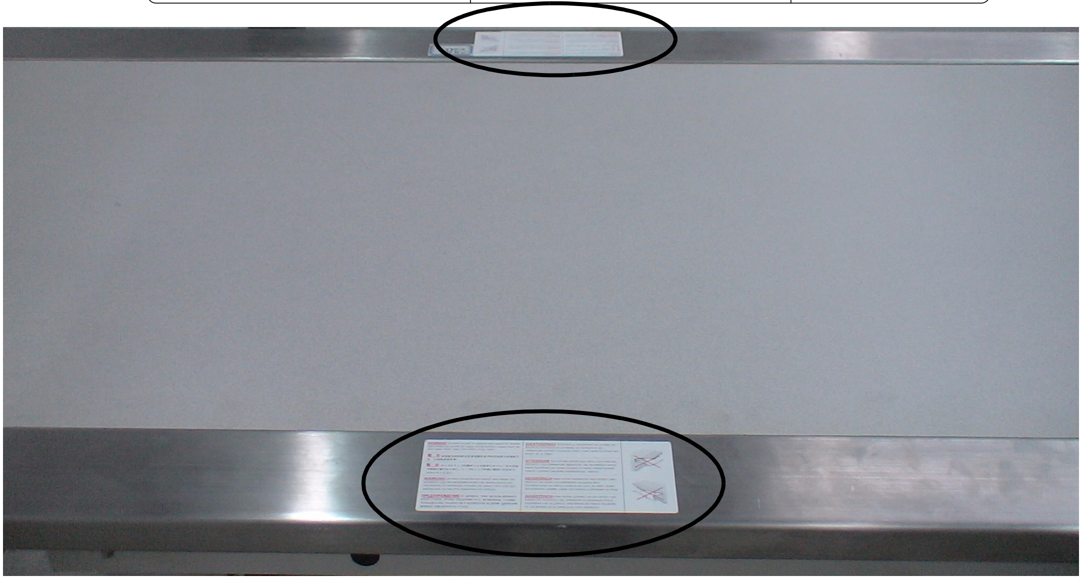
ПРЕДУПРЕЖДЕНИЕ НЕ ДЕРЖИТЕ РУКИ ВБЛИЗИ ВЕРХНЕГО КРАЯ СТОЛА, ЧТОБЫ ПРЕДОТВРАТИТЬ ВОЗМОЖНЫЕ ТРАВМЫ ПАЛЬЦЕВ И РУК ПАЦИЕНТОВ И ОПЕРАТОРОВ ВО ВРЕМЯ ДВИЖЕНИЯ ВЕРХНЕЙ ПОВЕРХНОСТИ СТОЛА.

AVERTISSEMENT POUR QUE LE MOUVEMENT DE LA TABLE NE BLESSE NI LES DOIGTS NI LES MAINS, LES PATIENTS ET LES OPÉRATEURS DOIVENT TOUJOURS TENIR LEURS MAINS À L'ÉCART DES BORDS DE LA TABLE.

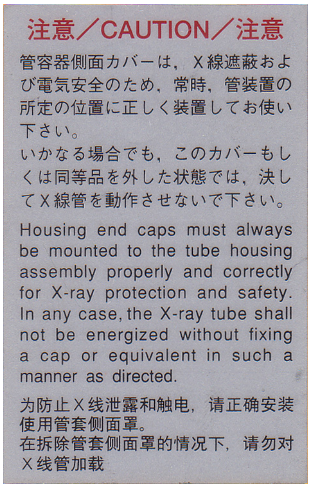
ATTENZIONE PER EVITARE LESIONI ALLE DITA E ALLE MANI DEL PAZIENTE E DELL'OPERATORE PROVOCATE DAL MOVIMENTO DELLA PARTE SUPERIORE DEL PIANO D'ESAME, LE MANO VANNO SEMPRE TENUTE LONTANO DAI BORDI SUPERIORI DEL TAVOLO.

ADVERTÊNCIA PARA EVITAR FERIMENTOS NOS DEDOS E NAS MÃOS DO PACIENTE E DO OPERADOR CAUSADOS PELA MOVIMENTAÇÃO DA PARTE SUPERIOR DA MESA, AS MÃOS DEVEM SER MANTIDAS SEMPRE LONGE DAS BORDAS SUPERIORES DA MESA.

ADVERTENCIA PARA EVITAR LESIONES EN LOS DEDOS Y LAS MANOS DEL PACIENTE Y DEL OPERADOR OCASIONADAS POR EL MOVIMIENTO DE LA CAMILLA, MANTENGA LAS MANOS ALEJADAS DE LOS BORDES DE LA CAMILLA EN TODO MOMENTO.



X-Ray Tube Warning Labels (3)



注意／CAUTION／注意

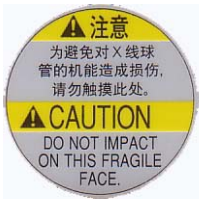
管容器側面カバーは，Ｘ線遮蔽および電気安全のため，常時，管装置の所定の位置に正しく装置してお使い下さい。

いかなる場合でも，このカバーもしくは同等品を外した状態では，決してＸ線管を動作させないで下さい。

Housing end caps must always be mounted to the tube housing assembly properly and correctly for X-ray protection and safety. In any case, the X-ray tube shall not be energized without fixing a cap or equivalent in such a manner as directed.

为防止Ｘ线泄露和触电，请正确安装使用管套侧面罩。

在拆除管套侧面罩的情况下，请勿对Ｘ线管加载

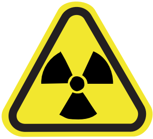


注意

为避免对Ｘ线球管的机能造成损伤，请勿触摸此处。

CAUTION

DO NOT IMPACT ON THIS FRAGILE FACE.

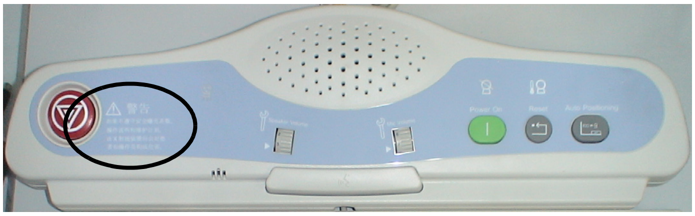


Radiation Warning

RCIM(II) Warning Label

⚠ **Warning**

This X-Ray unit may be dangerous to the patient and operator unless safe exposure factors operating instructions. maintenance schedules are observed



Regulatory Requirements

NOTE: This equipment generates, uses, and can radiate radio frequency energy. The equipment may cause radio frequency interference to other medical and non-medical devices and radio communications. To provide reasonable protection against such interference, this product complies with emission limits for Group 1 Class A Medical Devices as stated in EN 60601-1-2. However, there is no guarantee that interference will not occur in a particular installation.

NOTE: If this equipment is found to cause interference (which may be determined by switching the equipment on and off), you (or qualified service personnel) should attempt to correct the problem using one or more of the following measures:

- Reorient or relocate the affected devices.
- Increase the space separating the equipment and the affected device.
- Power the equipment from a source different from that of the affected device.
- Consult the point of purchase or the service representative for further suggestions.

NOTE: The manufacturer is not responsible for any interference caused either by the use of interconnect cables other than those recommended or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

NOTE: To comply with the regulations applicable to an electromagnetic interface for al Group 1 Class A Medical Device, all interconnect cables to peripheral devices must be shielded and properly grounded. The use of improperly shielded and grounded cables may result in the equipment causing radio frequency interference in violation of the European Union Medical Device directive and Federal Communications Commission regulations.

NOTE: Do not use devices which intentionally transmit radio frequency (RF) signals (cellular phones, transceivers, or radio controlled products) in the vicinity of this equipment, as it may cause performance outside the published specifications.

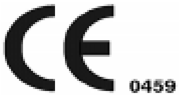
Keep the power to these type devices turned off when near the equipment.

The medical staff in charge of this equipment is required to instruct technologists, patients, and other people who may be around this equipment, to fully comply with the above requirement.

This product complies with the following requirements:

Council Directive 93/42/EEC concerning medical devices when it bears the following CE marking of conformity:

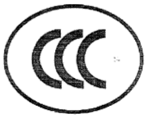
Figure 2-9 CE mark



The location of the CE mark label on the equipment is in the service system manual.

Council Directive CCC concerning medical devices when it bears the following CCC marking of conformity:

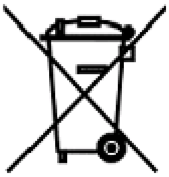
Figure 2-10 CCC mark



Disposal of Waste

This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.

Figure 2-11 Disposal of waste symbol



Dose Chart

Use Table 2-10 to compare film speed to dose values.

Table 2-10 Dose Chart

Expected Detector Default Dose (µGy)at 80 kVp is less than:	Equivalent Film Speed
16.00	100
12.90	125
10.00	160
8.00	200
6.25	250
5.00	320
4.00	400
3.20	500
2.50	640
2.00	800
1.60	1000

⚠

CAUTION: **Use the largest possible focal spot-to-skin distance to keep the patient absorbed dose as small as possible.**

⚠

CAUTION: **If no technical factors are present in the system for any view, the default settings are:**

- **kV = 40**
- **mA = 25**
- **mAs = N/A (AEC), 0.25 (Fixed)**
- **SID = 100cm**
- **Grid = In**

These values are placeholders only. No exposures should be made until the user selects values appropriate for the patient size.

X-ray Source Assembly Filtration

The x-ray source assembly is comprised of the x-ray tube and collimator. X-ray tube and collimator provide permanent, non-removable filtration of 1.9 mm aluminum equivalent @75kV and 1.1 mm aluminum equivalent @150kV respectively.Additional collimator filtration is user selectable. Refer to *Chapter 4: Hardware Overview* for detailed information.

CAUTION: **This system is designed to be used with only the GEHC MX-100 tube and collimator model number 2266999. Replacement of either of these components with different types may render the system non-compliant to applicable radiation safety standards and regulations.**

Chapter 3

Quick Step Guides

This section provides an overview of common tasks. Refer to the relevant chapters for detailed information.

Topics covered include:

- Hardware
  - Hand-switch
  - Emergency Stop button
  - Raise and Lower the Digital Table
  - Position the Table Longitudinally and Transversely
  - Radiographic Stretcher Table
  - Adjust the Overhead Tube Suspension (OTS) Position
  - Adjust the Tube Position
  - Rotate the Multi-Leaf Collimator
- General Acquisition
- Manual Patient Entry
  - Add Patient
  - Edit Patient Information

Hardware

This section lists the basic processes for working with the system hardware. Refer to Chapter 4: Hardware Overview for more information.

Hand-switch

1. Make sure your patient and the console are set up for the procedure.
2. Press the Prep/Expose button to the PREPARE position.
3. Press the Prep/Expose button to the EXPOSE position.
4. Release the Prep/Expose button after the exposure is completed.

Emergency Stop button

1. In an emergency situation, press the Emergency Stop button in with force.
2. Resolve the emergency situation.
3. When normal conditions are confirmed, turn the button clockwise so the table can be powered up.
4. At the Acquisition Workstation, click the [OK] button on the Emergency Stop screen.
   - The system will powe up automatically.

⚠

WARNING: **When the Emergency Stop button has been activated, the table will move freely. The table is not locked into position. Exercise extreme caution with your patient when this happens.**

Raise and Lower the Digital Table

1. Release the table lock, if necessary.
2. To raise the table, press the Up pedal two consecutive times. This activates the foot pedal.
3. Hold the foot pedal down until the desired height is reached.
4. Remove your foot from the pedal to stop the movement.
5. To lower the table, press the Down pedal two consecutive times.
6. Hold the foot pedal down until the desired height is reached.
7. Remove your foot from the pedal to stop the movement.

⚠

WARNING: **Before your patient gets on or off the digital table, always press the Table Positional button to block the control foot pedal functions momentarily. This avoids injuries to patient or damage to the equipment if a foot pedal is accidentally stepped on.**

Position the Table Longitudinally and Transversely

1. Release the table lock, if necessary.
2. Press the either outer foot pedal two consecutive times. This activates the foot pedal.
3. Hold the foot pedal down and position the table top.
   - You can float the table top in all directions while the pedal remains held down.

4. Manually move the tabletop in a longitudinal or transverse direction to the desired position.
5. Release the foot pedal to lock the tabletop.

⚠

WARNING: When moving the tabletop, be careful of where your and the patient's fingers are placed. Do not attempt to move the tabletop without using the foot pedals to release the longitudinal and transverse movement locks.

⚠

WARNING: To avoid injury to fingers and hand of patient and operator caused by table movement, hands must be kept away from table top edges at all times.

Radiographic Stretcher Table

1. To step the green lock of any of the breaks to release all the wheels.
2. To use handels at the two short sides and the groove under the two longitudinal sides to position the table to the desire place.
3. To step the red lock of any of the breaks to lock all the wheels.

⚠

WARNING: Before your patient gets on or off the radiographic stretcher table, always step the red lock of the breaks to lock the table. This avoids injuries to the patient .

Adjust the Overhead Tube Suspension (OTS) Position

1. Use the Longitudinal Lock Release button to move the OTS along the bridge of the overhead rail system.
   a) Press and hold the Longitudinal Lock Release button on the User Interface.
   b) Move the OTS to the desired position.
   c) c) Release the Longitudinal Lock Release button.
2. Use the Vertical Lock Release button to move the telescopic column up and down.
   a) Press and hold the Vertical Lock Release button on the User Interface.
   b) Move the telescopic to the desired vertical position.
   c) Release the Vertical Lock Release button.

3. Use the Lateral Lock Release button to move the OTS carriage from side to side on the bridge.
    a) Press and hold the Lateral Lock Release button on the User Interface.
    b) Move the OTS carriage to the desired position.
    c) Release the Lateral Lock Release button.
4. Use the All-Lock, Lock Release sensor to simultaneously move the OTS in vertical, lateral and longitudinal directions.
    a) Press and hold the All-Lock, Lock Release button on the User Interface.
    b) Move the OTS to the desired position.
    c) Release the All-Lock, Lock Release button.

NOTE: Detents remain activated if the detent button is selected.

Adjust the Tube Position

1. Use the Tube Angulation Lock Release button to rotate the tube about the short axis (cranial to caudal).
    a) Press and hold the Tube Angulation Lock Release button on the User Interface.
    b) Move the tube unit to the desired angle.
    c) Release the Tube Angulation Lock Release button.
2. Use the TSU Rotation Detent Release lever to rotate the tube about the vertical axis of the telescopic column.
    a) Press the Rotation Detent Release lever on the right side of the TSU.
    b) Rotate the tube unit.
    c) Release the lever. The TSU locks in the next 30 degree position.

⚠

WARNING: Potential Pinch Point: The area where the tube connects to the column may create a pinch point when the tube is rotated. Operators should keep their hands on the OTS handle and keep patient's clear while rotating the tube.

Rotate the Multi-Leaf Collimator

1. Move the locking lever on the multi-leaf collimator toward the front panel, i.e. toward you. This releases the collimator from the 0 lock-in position.
2. Grasp the multi-leaf collimator with both hands.
3. Rotate it to the desired angle and direction.

4. Return the locking lever to its original position. This prevents further rotation.

NOTE: When the collimator is rotated, the image border is adjusted to the maximum size based on the selected collimator FOV.

⚠

WARNING: **Always grasp the multi-leaf collimator in such a way that neither hand can be pinched or crushed between the handles and the collimator.**

General Acquisition

This section outlines the basic acquisition process.

Refer to *Chapter 6: Worklist* for more detailed information on adding or selecting procedures to perform.

Refer to *Chapter 7: Image Acquisition* for more detailed information about the Acquisition screen functions, how to conduct specific types of exams, and how to end exams.

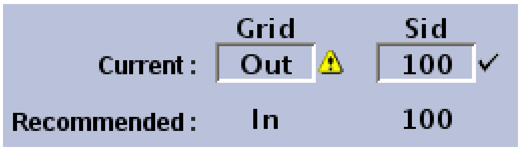
1. Add or select the procedure from the Worklist.

⚠

CAUTION: **Select all procedures for the patient.**

2. Click [START EXAM] or [RESUME EXAM].
3. Select the protocols for the exam.
4. Click [ACCEPT].
5. If multiple procedures were selected from the Worklist, choose the exam to perform.
6. Choose the protocol to perform.
7. Select the Patient Size. The system default is Medium Adult.
8. Choose the Receptor: Table, Wall stand, Table top (cassette).or Digital Cassette.
9. Choose AEC or Fixed mode (if applicable for the protocol).
10. Confirm or adjust the Grid and SID status.

Figure 3-1 Grid and SID position



	Grid		Sid	
Current :	Out	⚠	100	✓
Recommended :	In		100	

- An alert icon appears if the current Grid or SID is not in the recommended position for the technique.
- A checkmark appears if the current Grid or SID is in the recommended position for the technique.
- Figure 3-1 shows the Grid not in the recommended position and the SID in the recommended position.

11. Make technique adjustments as necessary: kV, mA, Focal spot, Cu Filer, and Ion chambers (AEC mode only).
12. Position the patient on the table or in front of the wall stand as appropriate.

WARNING: **If using AEC mode, collimation must be active over the ion chambers being used. If it is not possible to collimate over the selected ion chambers, then FIXED mode must be used in order to prevent possible patient over-exposure.**

13. Confirm or adjust the Patient Side field, if applicable.
14. Confirm or adjust the Patient Position field.
15. Confirm or adjust the Asymmetric Collimation (Wall stand vertical exposure mode).
16. Collimate and shield as appropriate for the exam.
17. Make exposure using the hand-switch.
18. Confirm image quality.
19. Make additional exposures as needed.
20. When all exams are complete, click [CLOSE].

Manual Patient Entry

Add Patient

Use this procedure to enter the patient's information into your system.

1. Open the Worklist screen.
2. Click [ADD PATIENT].
3. Enter the patient information.

CAUTION: Make sure the patient's name, Patient ID, birth date, and gender information are entered correctly.

4. Click [SAVE] or [START EXAM].

Edit Patient Information

Patient information can only be edited before any procedure has been opened.

1. Select the procedure from the Worklist.
2. Click [PATIENT INFORMATION].
3. Edit the information as necessary.
4. Click [SAVE] to record the changes and return to the Worklist.

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Chapter 4

Hardware Overview

This chapter explains the different hardware components of your system, such as the acquisition workstation, digital table, radiographic stretcher table, overhead tube suspension, digital wall stand, multi-leaf collimator, and digital detector.

Topics covered include:

- Compatible System Components
- System Descriptions
- Acquisition Workstation
- X-ray Exposure Lamp
- Overhead Tube Suspension
    - OTS Console
    - Overhead Rail System
    - Telescopic Column and Carriage
    - Longitudinal and Lateral Detents
    - Vertical Detent
    - Column Rotation
    - Tube Angulation
    - Multi-Leaf Collimator
- Digital Wall Stand
    - Detector Tilting
    - Detector Vertical Movement
    - Hand Grip (PA bar)
    - The Lateral Positioning Bar
    - Operator Override Switch
    - Tube Warm-up Misalignment
    - Vertical Drive Manual Override
    - Remote Control
    - Detector Loading/Removal
    - Grid Loading/Removal
- Digital Table
    - Use the Emergency Stop Button
    - Raise and Lower the Digital Table
    - Position the Table Longitudinally and Transversely
    - Detector Loading/Removal
    - Grid Loading/Removal
- Radiographic Stretcher Table (Option)
    - How to Use the Table
- System Cabinet
- Detector Overview
- Grids (Option)
- System Interlocks
    - Grid Interlock
    - Automatic Exposure Control (AEC) Interlock
    - Tube Position Interlock
- Accessories (Option)

Compatible System Components

S39212LA - FeiTian 65kw system

S39212LB - FeiTian 80kw system

S39212LC - Digital extend arm wallstand

S39212LD - Digital standard arm wallstand

S39212LE - Digital elevating table

S39212LF - Digital FP share system

S39212JE - OTS extension (190mm)

S39212JG - OTS extension (287mm)

S39212JF - 2m OTS bridge

S39212JH - 3m OTS bridge

S39212MA - Detector extended cable

S39212NA - WS mid-range grid

S39212NB - Table 100cm removable grid

S39212JH - Motorization WS kit

S39212NC - WS 100CM Removable grid

S39212ND - WS 180CM Removable grid

S3921KA - Stretcher table

S39212NE - 100CM grid (Stretcher apps)

S3921KM - Grid box

S3918JZ - Lateral cassette holder

S3918JW - Proteus XR/a compress .band

S3921LJ - Bar code reader

S39212MB - Detector Lateral Holder

S3921JJ - Auto-protocol recognition

S39212JA - Feitian dual energy function

S39212PA - D6000 multiple language kit-French

S39212PB - D6000 multiple language kit- Italian

S39212PC - D6000 multiple language kit- German

S39212PD - D6000 multiple language kit- Spanish

S39212PE - D6000 multiple language kit- Portuguese

S39212PF - D6000 multiple language kit- Chinese

S39212PG - D6000 multiple language kit- Russian

S39212PH - D6000 multiple language kit- Korean

S1200WA - Feitian 8000 French keyboard

S1200WB - Feitian 8000 German keyboard

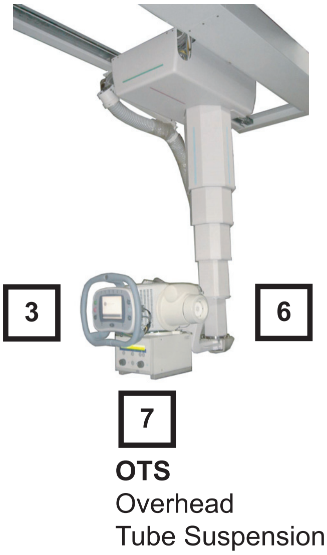
S1200WC - Feitian 8000 Spanish keyboard

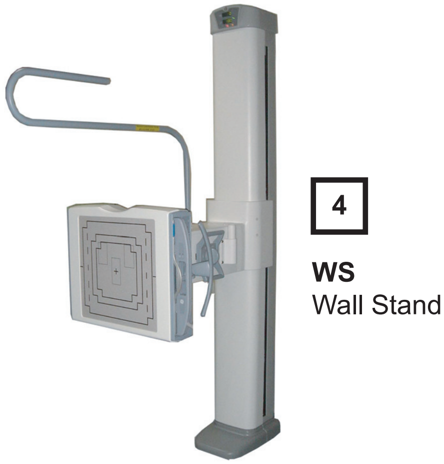
S1200WD - Feitian 8000 Italian keyboard

S1200WE - Feitian 8000 Portuguese keyboard

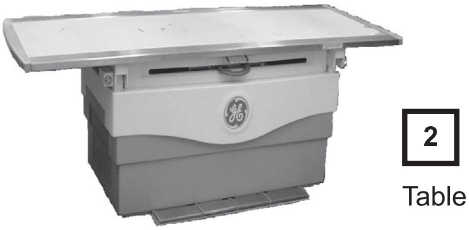
S1200WF - Feitian 8000 Swedish keyboard

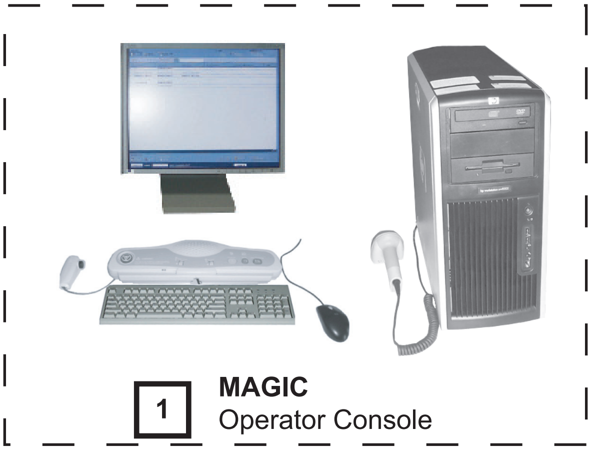
System Descriptions


3
6
7
OTS
Overhead
Tube Suspension


4
WS
Wall Stand

5
SKL
System Cabinet




1
MAGIC
Operator Console

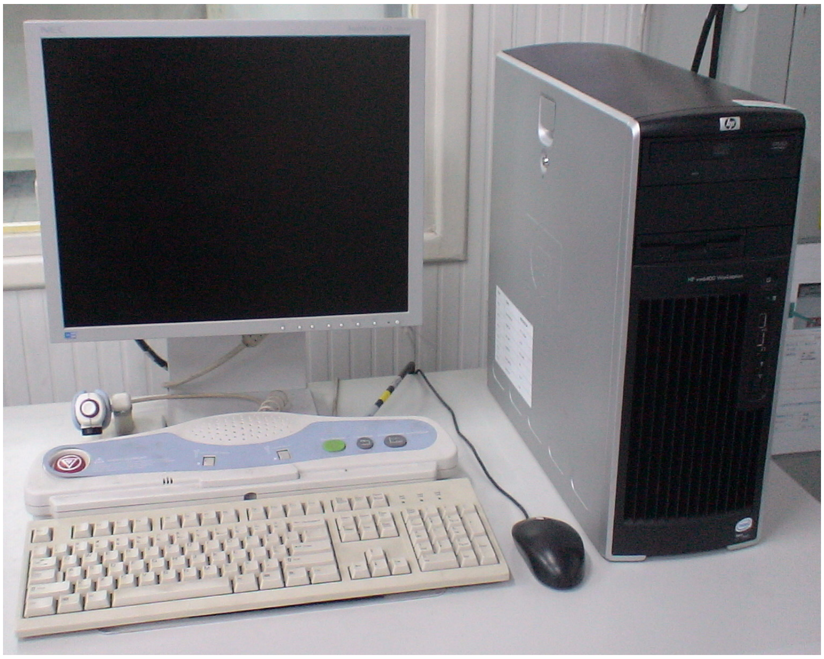
The Definium™ 6000 is divided into basic components:

1. Operator Console
2. Digital Table
3. OTS Radiographic Suspension
4. Wall Stand
5. System Cabinet
6. X-ray Tube
7. Collimator
8. Radiographic Stretcher (option)

Acquisition Workstation

The Acquisition Workstation (Figure 4-1) has its own dedicated computer and image data base. The Workstation applications are based on a graphical, single screen, mouse-driven interface. Images, lists, menus, and control panels are displayed within graphical screens on the workstation's monitor. You make your selections using buttons, menus and control panels.

Figure 4-1 Acquisition Workstation



The workstation has several components:

- A computer unit with internal hard disk unit for system software and image storage, an internal 3 1/2 inch floppy disk drive, and a DVD-R/CD-RW combination drive
- Single monitor
- An alphanumeric keyboard, mouse
- Radiology Control Interface Module (RCIM(II))
- Console hand-switch
- Bar code reader

The Acquisition workstation supports many functions:

- Image acquisition using the digital detector
- Image display and manipulation
- Image transfer to other workstations using the DICOM standard
- Image transfer to a recordable CD (option)

WARNING: **To avoid image loss, please periodically backup the images from the Acquisition Workstation to the given image storage system.**

WARNING: **To guarantee a good working status, please make sure the used rate of system hardware space is less than 60% in the Acquisition Workstation.**

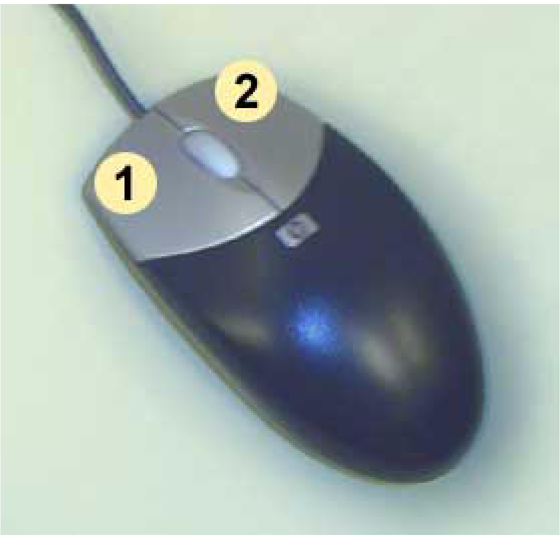
Mouse Controls

The mouse (Figure 4-2) is a hand-operated device that you maneuver across the surface of a pad. As you do, the on-screen cursor mimics the movement of the mouse, allowing you to move among screens and between monitors. For instance, moving the mouse to the right causes the on-screen cursor to move to the right. The selections are made by clicking the left and right buttons.

The mouse pointer (or cursor) will automatically move between monitors as the far right and left edges are reached.

When typing information into a screen, the mouse pointer must be on the same monitor as the screen, or the text will not be entered. If the mouse pointer moves to the other monitor, click the mouse in the screen where you are typing.

Figure 4-2 The mouse



1. Left Button
2. Right Button

Table 4-1 Mouse actions

Mouse Action	Description
Click	Press and release the left mouse button to select an item, activate a button or icon, or set an insertion point at the cursor's location. The action performed depends on the item that is being clicked.
Click and drag	Press and hold the left mouse button down while moving the cursor to the desired location. This is used to select multiple items, move items, or use annotation tools.

Radiology Console Interface Module (RCIM(II))

The Radiology Console Interface Module (RCIM(II)) (Figure 4-3) controls the power and reset functions for the system. The RCIM (II) has the power on button, reset button, an emergency stop button, and indicator lights. These functions are described in Table 4-2.

The RCIM(II) is placed at the workstation between the monitors and keyboard.

Figure 4-3 RCIM(II)

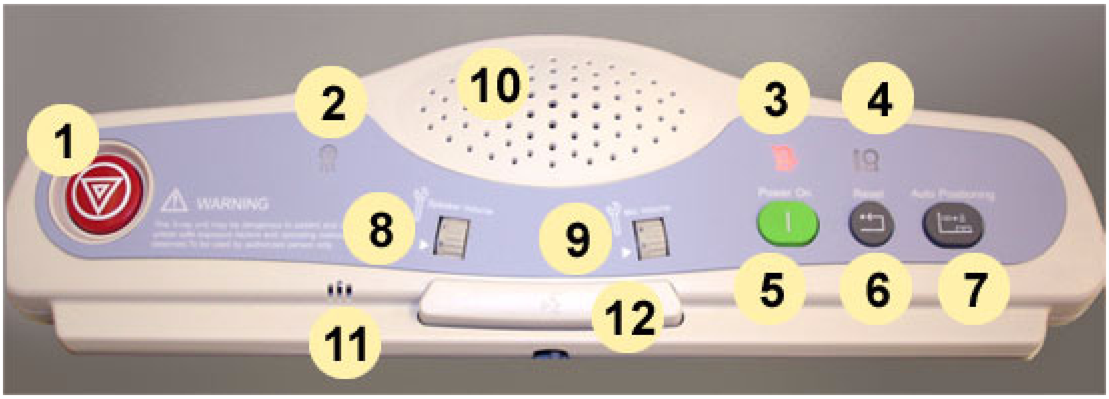
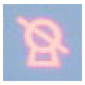
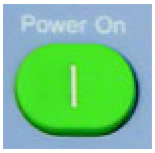
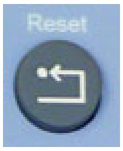
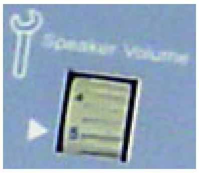
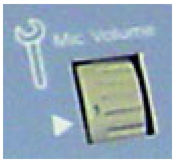
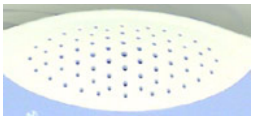


Table 4-2 RCIM(II) controls

Control		Description
1. Emergency Stop button		Immediately powers down the Table, OTS, and Wall Stand. Also stops image exposure.

Control		Description
2. X-ray Exposure indicator		Lights up when x-rays are being emitted, including tube warm up and QAP.
3. Expose Hold indicator		Lights up when there is some inhibit to taking exposures. Click the Expose Hold button on the Worklist or Acquisition screens for a list of all current inhibits.
4. Tube Overheat Indicator		Lights up when the tube is too hot and the heat unit only exists 20%. Refer to *Chapter 5: General Information - Tube Warm Up* for more information.
5. Power On button		Turns on the power for the entire system. Refer to *Chapter 5: General Information - Tube Warm Up* for more information.
6. Reset button		Shuts down and re-starts the system for QAP or in the event of software failure. Refer to *Chapter 5: General Information - System Start up and Shut Down* for more information.
7. Auto Positioning button	Auto Positioning	To be used in future for automated system positioning. Not functional in this product.
8. Speaker Volume control		Adjusts the volume of the speaker in Online center service. Not active in this configuration.

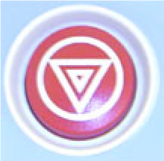
Control		Description
9. Mic Volume control		Allows you to speak through the intercom in Online center service. Not active in this configuration.
10. Speaker		Allows you to hear beeper indication of system, e.g. x-ray ON, limit indication and error indication.
11. Microphone		Allows you to speak through the intercom in Online center service. Not active in this configuration.
12. Intercom talk button		Turns on the microphone to use the intercom in Online center serviece. Not active in this product.

Use the Emergency Stop Button

Use this procedure to perform an emergency stop and to reset the Emergency Stop button.

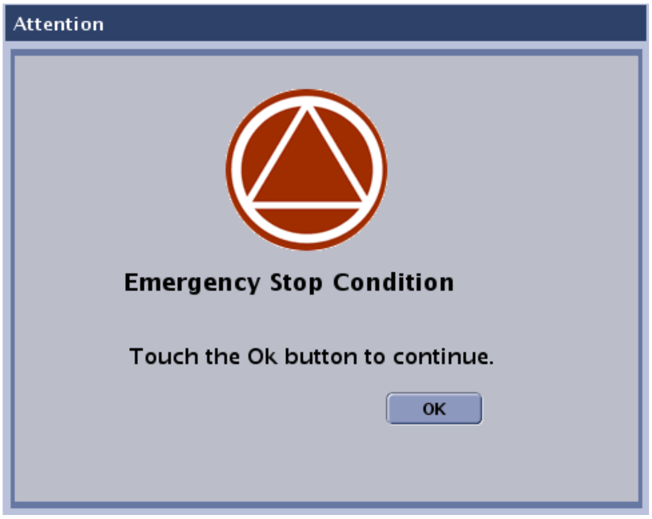
1. In an emergency situation, press the Emergency Stop button in with force.

Figure 4-4 Emergency Stop button



2. Emergency Stop screen pops up.

Figure 4-5 Emergency Stop screen



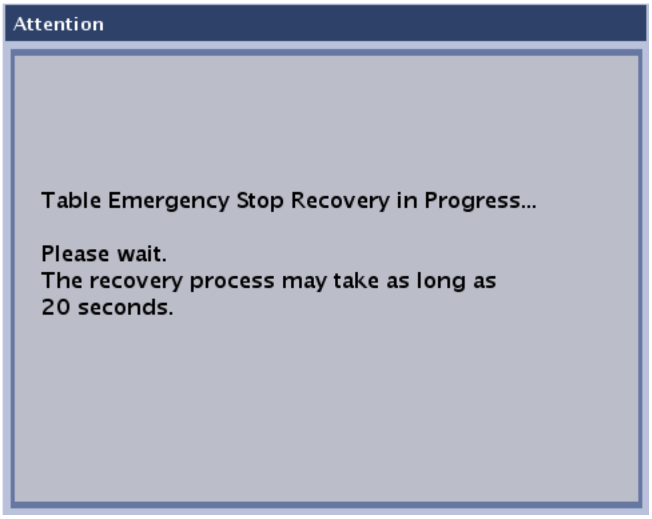
Attention

Emergency Stop Condition

Touch the Ok button to continue.

3. Resolve the emergency situation.
4. When normal conditions are confirmed, at the acquisition workstation, click [OK] button on the Emergency Stop screen (Figure 4-5). Emergency Stop Recovery screen appears.

Figure 4-6 Emergency stop recovery



Attention

Table Emergency Stop Recovery in Progress...

Please wait.
The recovery process may take as long as
20 seconds.

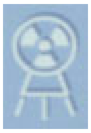
- The system will power up automatically.

WARNING: **When the Emergency Stop button has been activated, the table will move freely. The table is not locked into position. Exercise extreme caution with your patient when this happens.**

X-ray Exposure Lamp

When X-rays are being produced in the radiographic mode, the red X-ray exposure indicator lights up in red on the RCIM(II). The console beeps as X-rays are procuded when the X-ray Prep/Expose button on the Hand-switch is pressed. The tone ends when exposure is terminated or completed.

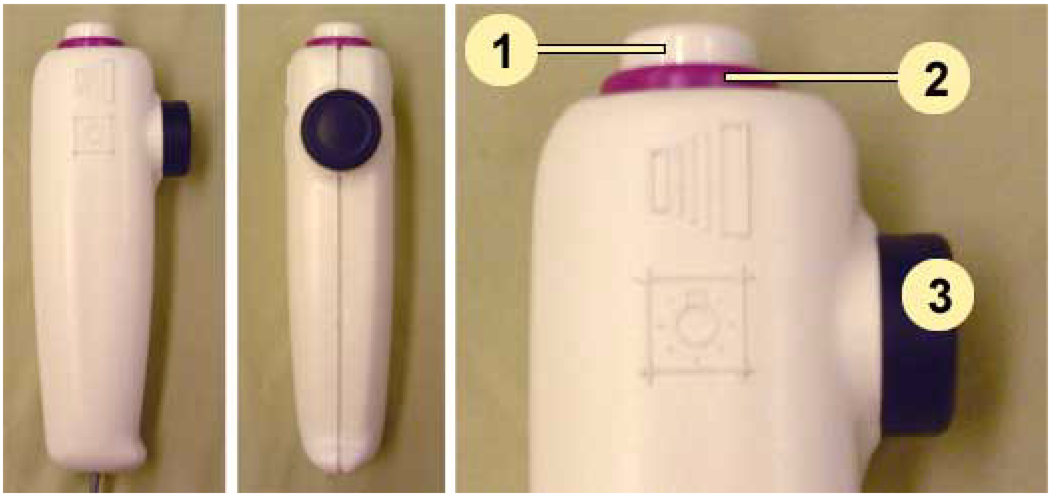
Figure 4-7 X-Ray exposure lamp on RCIM(**II**)



Hand-switch

Record exposures are made with the console Hand-switch. The Prep/Expose button on this switch has three positions: OFF, PREPARE, and EXPOSE (Figure 4-8 and Table 4-3).

Figure 4-8 Console hand-switch



1. PREPARE (target rotating)
2. EXPOSE
3. Collimator Lamp Switch (not active in this product)

Table 4-3 Hand-switch positions

Position	Description
OFF	The OFF position is when no pressure is applied to the Prep/Expose button on top of the Hand-switch.

Position	Description
PREPARE 	PREPARE is the next position on the Hand-switch. When it is partially pressed, it brings the rotor up to speed and heats the filament. PREPARE also checks the system interlocks and verifies the system is ready to make an exposure. If you release the button, it returns to OFF.
EXPOSE 	The EXPOSE position is when the button on the Hand-switch is fully depressed. This produces X-rays that are recorded. Release the Prep/Expose button after the exposure is completed.

Use this procedure to operate the console Hand-switch to prepare and record exposures.

1. Make sure your patient and the console are set up for the procedure.
2. Press the Prep/Expose button to the PREPARE position.
    - When the PREPARE function is completed, the READY sound with a high tone will be heard.
3. Press the Prep/Expose button to the EXPOSE position.
    - The Record exposure is taken and a low tone will be heard with the X-ray exposure indicator light is on.

NOTE: A procedure must be selected prior to attempting an exposure or an error will occur.

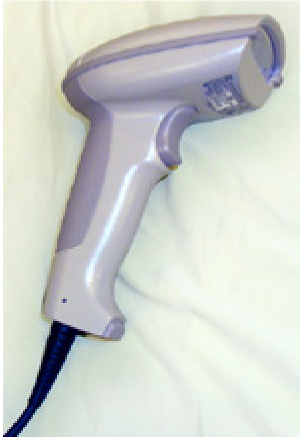
4. Release the Prep/Expose button after the exposure is completed.

Bar Code Reader (Option)

The bar code reader is a fast, easy way to enter data into the system. The bar code scanner allows you to aim at a printed bar code on paper and scan the information into the system. The printed bar code information comes from a RIS or HIS system through a network.

The reader reads the bar code information and enters it into the selected text box. An audible beep sounds as the system detects and automatically enters the information. Some bar code readers move the mouse cursor to the next text box for you. Others require you to manually move the cursor to the next text box.

Figure 4-9 Bar code reader



CAUTION: **The valid distance between the bar code reader and the paper for the bar code reader to read the printed bar code on paper is less than 15cm.**

CAUTION: **Laser Light. Do not stare into beam, IEC class 2 laser product 630 - 680 nM, 1.0 mW Laser.**

Monitor

The Acquisition workstation has one flat-panel monitor, where the Worklist , Acquisition screens, the Image Viewer and the Image Management screens appear.

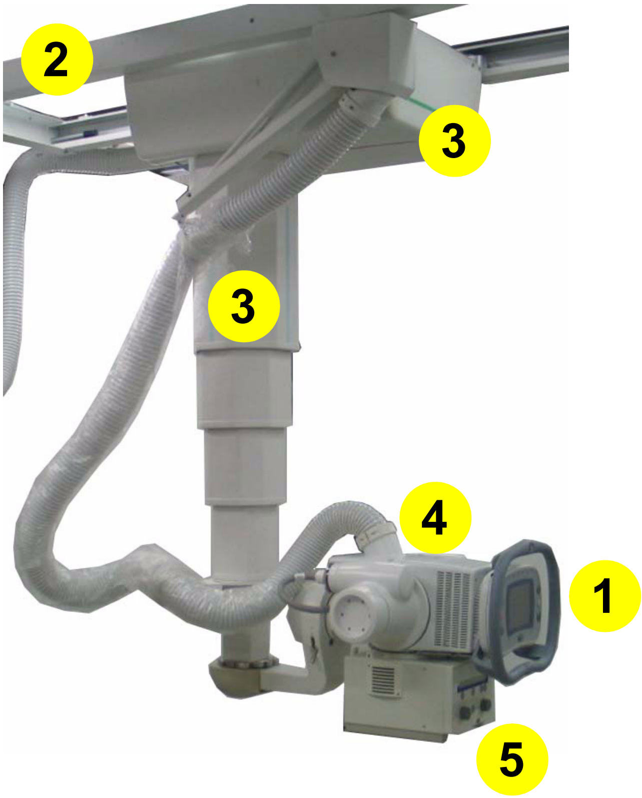
NOTE: In periods of inactivity longer than a certain minutes, the monitor screen goes blank. Press any key on the keyboard or move the mouse to restore the monitor's image. This "certain minutes" could be 0-9999 minutes which would be adjusted by Field Engineer according to customer's request.

WARNING: **The monitor is a view monitor, and does not support diagnosis. To guarantee the accuracy of diagnosis, please print films or transfer the images to a diagnosis monitor to make diagnosis.**

Overhead Tube Suspension

The Overhead Tube Suspension (OTS) is the positioning device that supports the X-ray tube and OTS console. The suspension provides convenient movement and accurate positioning of the equipment.

Figure 4-10 Overhead Tube Suspension (OTS)



The X-ray OTS consists of the following major elements:

1. OTS console
2. Overhead stationary rail system
3. Telescopic column and carriage
4. Tube
5. Multi-leaf collimator

OTS Console

The OTS User Interface (Figure 4-11 and Table 4-4) allows you to make receptor, FOV, collimation, kV, mA and mAs selections using the touch screen in the middle of the OTS Console without returning to the Acquisition Workstation. This interface also provides the functions to move the OTS in multiple directions.

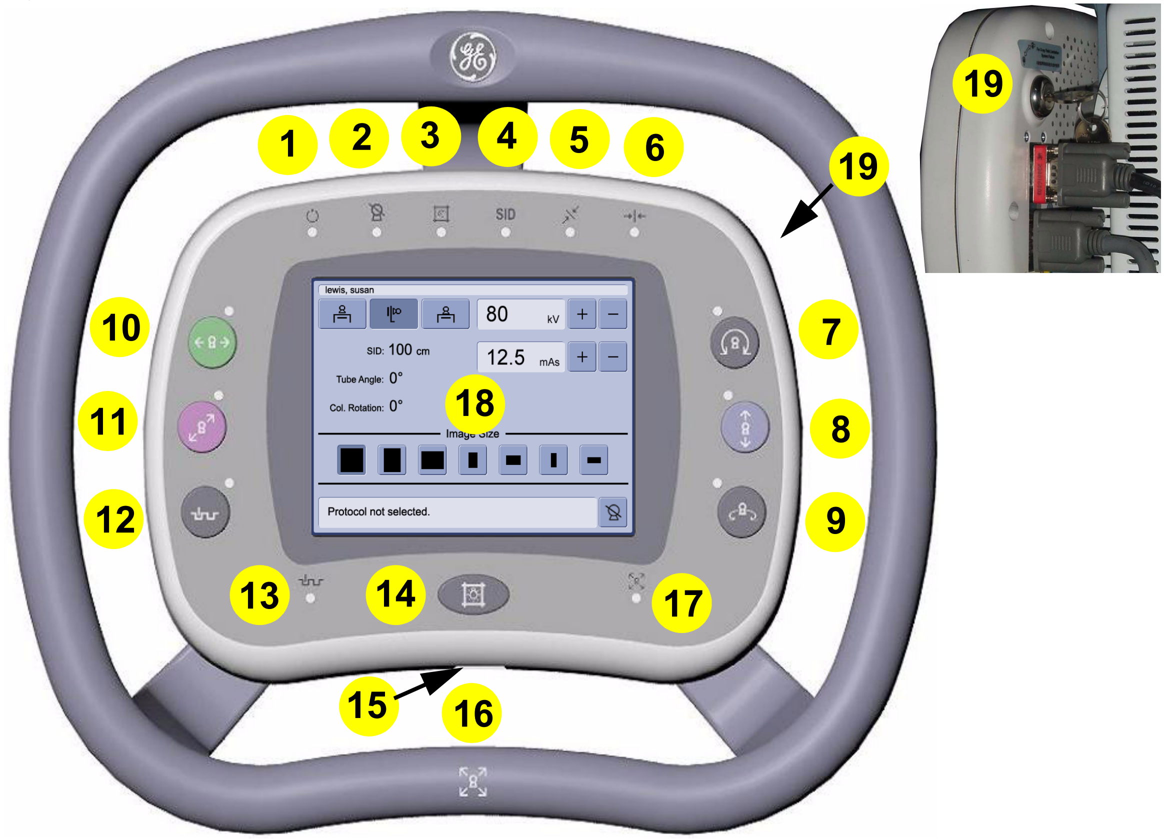
NOTE: FOV and collimation can either be changed on the OTS console or on the Acquisition Workstation.

NOTE: Changing exposure parameters or receptors on the OTS console or the Acquisition Workstation will result in a change to both.

CAUTION: When one operator is operating the Acquisition Workstation (OTS touch screen), the other operator cannot operate OTS touch screen (the Acquisition Workstation) properly. Don't operate both of them at the same time.

CAUTION: To touch the OTS touch screen may change the settings on Acquisition Workstation, please double check all the acquisition parameters after touching the OTS touch screen before an acquisition.

Figure 4-11 OTS console



lewis, susan

80 kV

12.5 mAs

SID: 100 cm

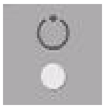
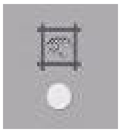
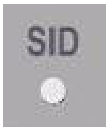
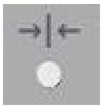
Tube Angle: 0°

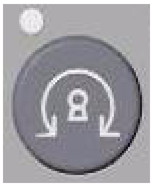
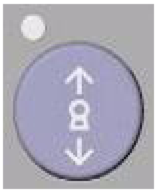
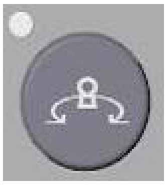
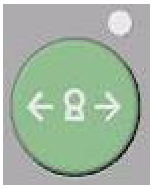
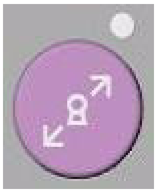
Col. Rotation: 0°

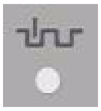
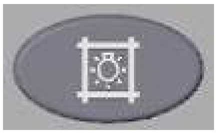
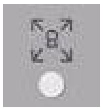
Image Size

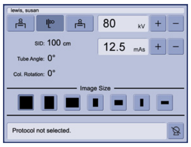
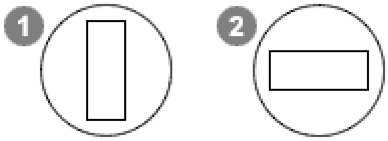
Protocol not selected.

Table 4-4 OTS functions

Item Number and Type	Name	Description
1. Indicator 	Ready LED	Indicates the exposure interlocks are satisfied (green light). The Indicator flashes when the key switch (#19) on the back of OTS Console is in the OVERRIDE position.
2. Indicator 	Exposure Hold	Indicates the exposure interlock is active (red light), which inhibits exposure. When the Exposure Hold is active, you may click the Exposure Hold icon on the touch screen for display of the active interlock (SID range, Tube pivot, etc.)
3. Indicator 	Manual Collimation LED	Indicates when the system has switched to manual collimation mode (orange steady light). In this mode, the collimator field of view (FOV) is not limited to the receptor area. If the key switch is in OVERRIDE position, the manual collimation LED flashes (yellow blinking light).
4. Indicator 	SID Detent LED	Indicates configurable SID detents. SID detents are (Wallstand is 0 degree): 102cm, 107cm, 112cm, 117cm, 183cm, and 2 custom SID values. The default SID is 183cm (72inch). SID detents are(Wallstand is 90 degree): 102cm, 107cm,112cm, 117cm, 127cm, and 2 custom SID values. The default SID is 102cm (40inch). **NOTE:** 1. SID detents will be set by Field Engineer accordiong to customer's request. 2. When reach to a SID detent the OTS would be locked along the SID direction and this green light is on.
5. Indicator 	Lateral Detent LED	Indicates the lateral detent position. When reach the lateral detent, the OTS would be locked along the lateral direction and this green light is on.
6. Indicator 	Longitudinal Detent LED	Indicates the longitudinal detent position. When reach the longitudinal detent, the OTS would be locked along the longitudinal direction and this green light is on.

Item Number and Type	Name	Description
7. Control 	Tube Angulation Lock Release	Releases the lock to allow tube angulation. The lock is active when you keep pressing the button. The LED is lit when the button is pressed. The Angulation lock is an electromagnetic, spring applied type. It remains on when the system power is off.
8. Control 	Vertical Lock Release	Releases the lock to allow vertical motion of the OTS. The lock is active when you keep pressing the button. The LED is lit when button is pressed. **IMPORTANT!:**The blue color of this button is corresponding to the blue line on the OTS column as a reminder that this button is always a vertical motion lock no matter what angulation the Tube is.
9. Control 	Column Rotation Release	Releases the lock to allow column rotation of the OTS. Not active in this product.
10. Control 	Longitudinal Lock Release	Releases the lock to allow longitudinal motion of the OTS. The lock is active when you keep presssing the button. The LED is lit when button is pressed. **IMPORTANT!:**The green color of this button is corresponding to the green line on the OTS carriage as a reminder that this button is always a longitudinal motion lock no matter what angulation the Tube is.
11. Control 	Lateral Lock Release	Releases the lock to allow lateral motion of the OTS. The lock is active when you keep pressing the button. The LED is lit when button is pressed. **IMPORTANT!:**The red color of this button is corresponding to the red line on the OTS carriage as a reminder that this button is always a lateral motion lock no matter what angulation the Tube is.

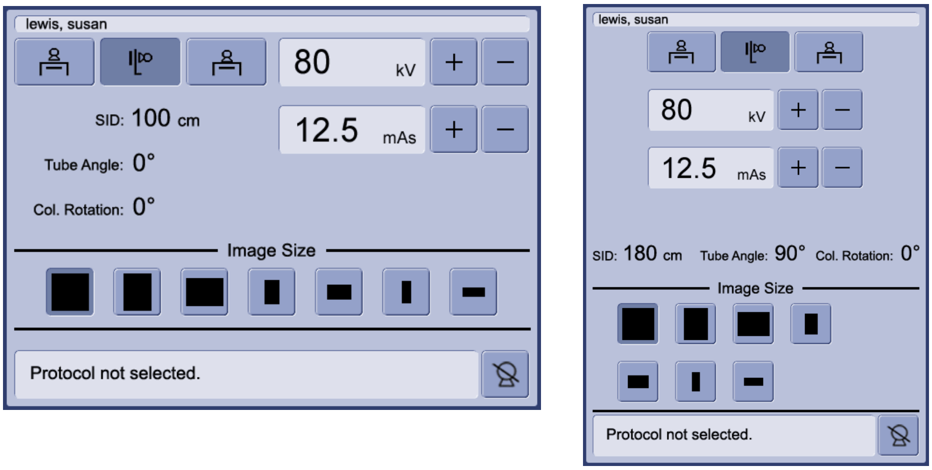
Item Number and Type	Name	Description
12. Control 	Detent Lock	Activates the configured lock detent positions for lateral alignment and SID. The Locks activate when you position the tube in these positions. **NOTE:** The green indication light #13 at the up right corner is indicating the detent lock button is enable and the detent lock is on.
13. Indicator 	Detent Lock Indicator	To indicate the detent lock is active. The green light is lit up when the lock is active.
14. Control 	Collimator Field Light	Toggles the collimator field light ON or OFF. The light ON time is controlled by the system configuration.
15. Sensor 	Infrared Sensor	This sensor is at the position where the black circle is indiacting. It is use to active the all lock release. **NOTE:** If the hand is out of the sensor range, the lock would not work.
16. Control 	All-Lock Release	Releases the lock to allow vertical, lateral and longitudinal motion of the OTS. The lock is active when you grasp the bulgy part (indicating the range of the infrared sensor) of the OTS console bar which has an all lock release indicator on it. **NOTE:** To grasp here would active the infrared sensor above the bar and then can release the lock.
17. Control 	All Transitional Locks Released LED	This green light is lit up when all lock release is active except for tube angulation.

Item Number and Type	Name	Description
18. Control Screen  lewis, susan 80 kV SID: 100 cm 12.5 mAs Tube Angle: 0° Col. Rotation: 0° Image Size Protocol not selected.	OTS Control Screen	Displays and controls exposure settings. Refer to *OTS Control Screen* for more information.
19. Control 	Key Switch	Located on the back of the OTS User Interface, this key switch is intended for use when a system failure has occurred. The OVERRIDE position disables the exposure hold interlocks and allows exposure. In the digital wall stand applications, the full detector area and SID = 100cm is used when in OVERRIDE position. **NOTE:** Engaging OVERRIDE mode shuts down certain system functions, including Auto-tracking and Auto-collimation. This may effect image quality. **NOTE:** If OVERRIDE is engaged, return the switch to the NORMAL position at the end of the exam. 1) Normal Position 2) OVERRIDE Position  **WARNING: If the key switch OVERRIDE is selected, you must ensure the collimator field of view matches the receptor and the tube is aligned to the chosen receptor. Use the collimator field light to match the X-ray field to the chosen receptor.**

OTS Control Screen

The OTS control screen displays the SID, tube angle, and column rotation. The control screen allows you to change the kV, mAs, receptor, and FOV. The control screen is able to change orientation from horizontal to vertical as the OTS is rotated.

Figure 4-12 OTS control screen in horizontal and vertical orientation



lewis, susan

80 kV

SID: 100 cm

12.5 mAs

Tube Angle: 0°

Col. Rotation: 0°

Protocol not selected.

lewis, susan

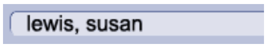
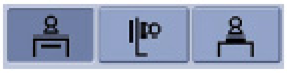
80 kV

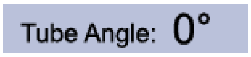
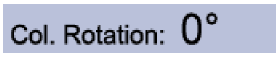
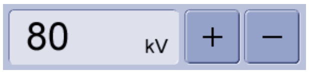
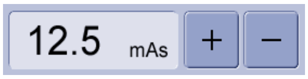
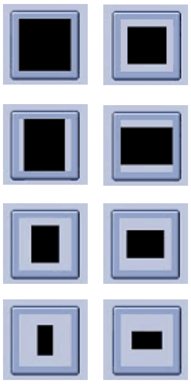
12.5 mAs

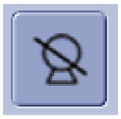
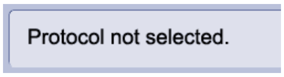
SID: 180 cm Tube Angle: 90° Col. Rotation: 0°

Protocol not selected.

Table 4-5 OTS control screen functions

Item	Description
Patient Name  lewis, susan	If enabled on your system, shows the patient name for the current exam. If this feature is not enabled, the field will be blank.
Receptors 	Select the receptor. The availability of the receptor depends on if it is available based on the protocol setup on the Acquisition Workstation. If the receptor is not defined in the selected preset procedure, the receptor is not selectable from the OTS.
SID SID: 100 cm	Displays the SID value in digital table and wall stand applications. The SID display is always 100cm if you have selected table top mode or if tube angulation exceeds +/-45 degree of receptor. When tube is not align with the wall stand (For example: tube 90 degree + wall stand 90 degree, tube 0 degree + wall stand 0 degree), SID display would be 100cm. **NOTE:** Indicates the SID scale in Metric or English units, depending on the system configuration.

Item	Description
Tube Angle  Tube Angle: 0°	Displays the tube angulation in degrees.
Column Rotation  Col. Rotation: 0°	Displays the column rotation in degrees. Only two values would be displayed: 0 (representing column is 0 degree) 1 (representing column is not 0 degree but at any other degree)
kV  80 kV + –	Increases or decreases the exposure kV. Press and release the button to adjust the value by 1kV.
mAs  12.5 mAs + –	Increases or decreases exposure mAs. The range is based on the focal spot selected at the Acquisition Workstation. Adjust the exposure mA when select the AEC mode. Adjust the exposure mAs when select the fixed mode. If AEC mode is selected at the Acquisition Workstation: • This control is disabled. • The display value is blank until the exposure is completed.
Image Size (FOV) 	Selects the FOV for the exposure. Sizes are (from left to right): 41x41cm 35x35cm 35x41cm 41x35cm 24x30cm 30x24cm 18x24cm 24x18cm

Item	Description
[Exposure Hold] 	Appears when there is some condition that prevents an x-ray from being taken, such as the exam room door being open or the tube is not in alignment with the detector. Press the button to view a list of all errors and interlocks that are preventing the exposure. The items are removed from the list as they are corrected. The button disappears when all errors and interlocks are corrected.
System Status  Protocol not selected.	Displays the last system status message.

Overhead Rail System

The overhead rail system consists of the stationary rails (ceiling mounted) and a bridge that travels longitudinally along the rails. Guide bearings maintain alignment of the bridge with the rails and the X-ray table. The Longitudinal Lock Release button on the User Interface controls the motion of the bridge along the rails.

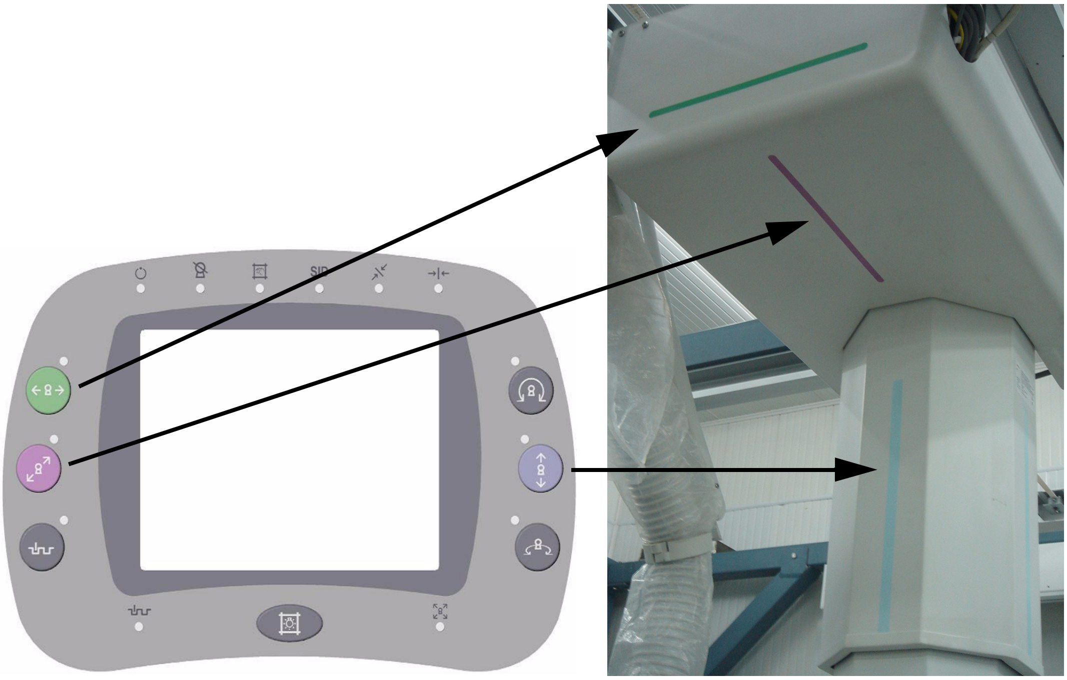
Telescopic Column and Carriage

The telescopic column (Figure 4-10) permits vertical travel of the tube unit. The Vertical Lock Release button on the User Interface controls the vertical motion. The vertical load is balanced by a spring counterpoise system within the carriage. The counterpoise system is equipped with a safety-locking feature to prevent the tube unit from falling in the event of spring or main cable failure. Adding an accessory, such as a collimator extension cylinder, may cause the suspension to be slightly out of balance. The carriage rides laterally within the bridge. The Lateral Lock Release button on the user interface controls the lateral motion.

⚠

CAUTION: **Collimator accessory weight may not exceed 4.5 kg (10 pounds). Use special care when using such an accessory since the tube unit tends to descend when the Vertical lock is released.**

Figure 4-13 Color correspondance between OTS motion control buttons and three indication lines on the carriage and the column.



Red: Always indicating the lateral direction.

Green: Always indicating the longitudinal direction.

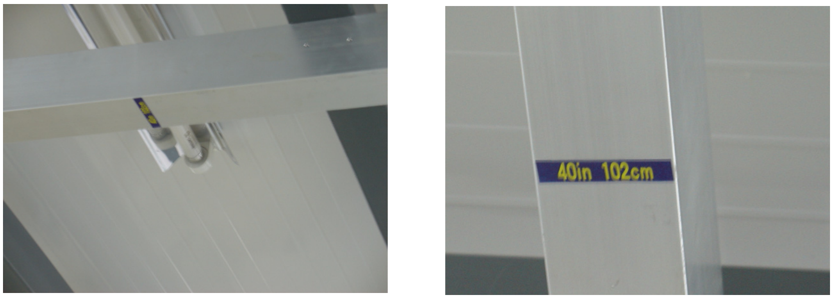
Blue: Always indicating the vertical direction.

NOTE: The color correspondance is used to indicate the movement directions in case there would be a direction identification confusion after the tube rotation.

Longitudinal and Lateral Detents

The suspension is equipped with Longitudinal and Lateral detents to automatically apply the locks and signal the collimator when the tube is positioned at specific SIDs (Source Image Distance), for digital table or wall stand procedures. The locks are actuated through SID detent sensors that ride along the bridge and stationary rails, and detent-coded brackets set at pre-determined locations (Figure 4-14). For the digital table, the lateral detent is set at the table's lateral center line. For the wall stand, the lateral detent is set at the wall stand lateral center line, and the longitudinal detent is set at configurable SID (For example: 183cm (72 inches)). Selections are made at the time of installation and usually with the focal spot over the longitudinal table and the wall stand center line.

Figure 4-14 Detent position on overhead raill



Vertical Detent

There is a default vertical detent switch in the OTS column that sets the locks when the tube is at 102cm (40 inch) above the detector and only when the detechtor is 90 degree.

The Vertical SID Detent position (102cm, 107cm, 112cm etc.) is selectable at system installation.

The detent is used to align the center of the detector in vertical direction when Auto-tracking is inactive.

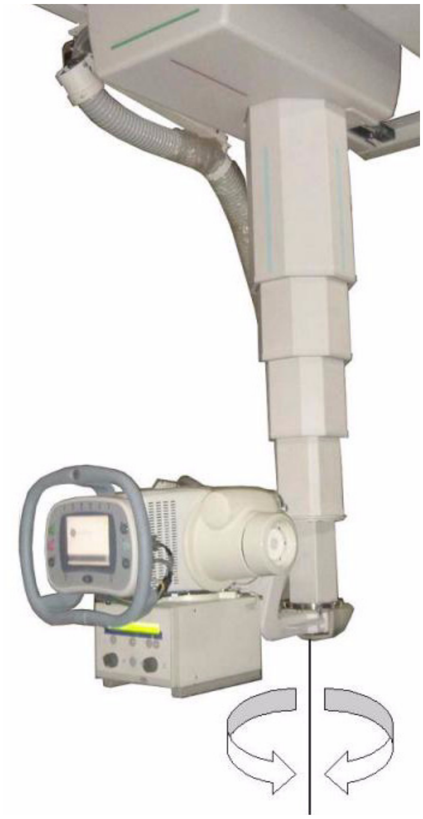
Column Rotation

The Tube Support Unit (TSU) allows you to rotate and angle the tube for better positioning. The TSU can be rotated (pivoted) around the vertical axis of the telescopic column 180 degrees. The TSU automatically locks in each 30 degree position. Applicaton mode refer to *Tube Angulation* .

The degree of column rotation is indicated on the OTS user interface. Column rotation is set at 0 degree.

WARNING: Strongly recommend to rotate the tube around the column and turn the OTS console right to face the operators for stretcher table application.

Figure 4-15 Column rotation



Tube Angulation

The other rotational feature of the tube support permits tube angulation (Figure 4-15) about the short axis. The amount of angulation is indicated on the User Interface. The limits of angulation are 180 degrees in either direction from the X-ray beam down position. The Tube Angulation Lock Release button on the User Interface maintains angular positions while positioning the tube. Angular positions detent every 90 degrees, automatically starting with the X-ray beam down position.

NOTE: There are three modes of tube position for applications: Wallstand mode, digital table mode and stretcher table mode. See the descriptions below.

Figure 4-16 X-ray tube angulation

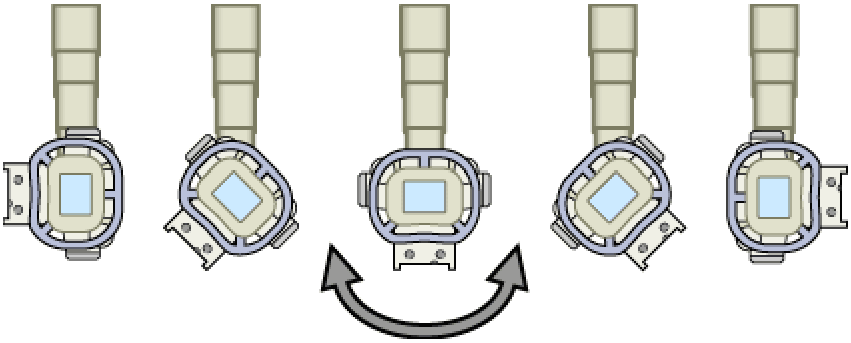


Figure 4-17 X-ray tube angulation for wallstand application

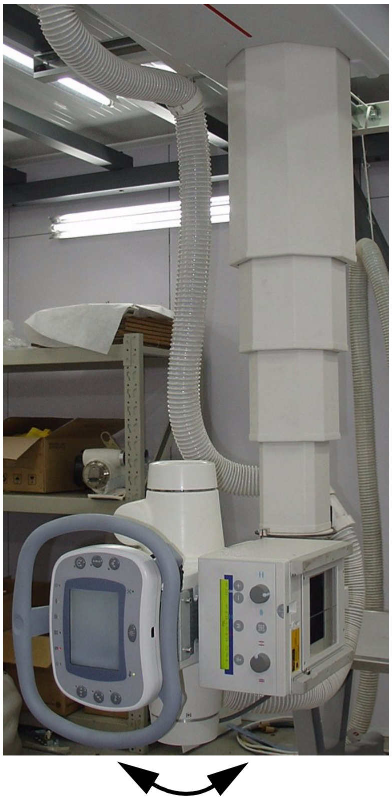
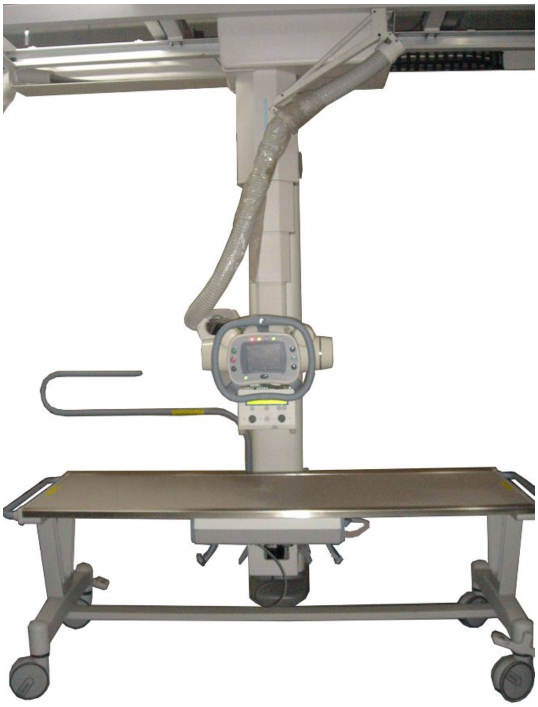


Figure 4-18 Standard stretcher table application mode



WARNING: **Strongly recommend to rotate the tube around the column and turn the OTS console right to face the operators for stretcher table application.**

WARNING: **The gird must be changed to 100cm (stretcher table mode) or 130cm (stretcher table mode) when the tube is at the standard table application position and would do a tube angulation application at the same time. If the grid is not one of these two, the IQ would be seriously impacted!**

NOTE: In emergencies, the tube unit can be moved against the force of the locks.

Adjust the Tube Position

For certain exams, you may need to angle and/or rotate the tube in order to include all of the required anatomy in the FOV. Use this procedure to adjust the position of the tube.

NOTE: The steps of this procedure can be performed in any order and not all of the steps are required. You do not have to follow this exact sequence. This procedure is intended to help you learn the various methods of positioning the tube.

1. Use the Tube Angulation Lock Release button to rotate the tube about the short axis.
   a) Press and hold the Tube Angulation Lock Release button on the OTS console.
   b) Move the tube unit to the desired angle.
   c) Release the Tube Angulation Lock Release button.
2. Use the TSU Rotation Detent Release lever to rotate the tube about the vertical axis of the telescopic column.
   a) Press the Rotation Detent Release lever on the right side of the TSU.
   b) Rotate the tube unit.
   c) Release the lever. The TSU locks in the next 30 degree position.

⚠

WARNING: **Potential Pinch Point: The area where the tube contents to the column may create a pinch point when the tube is rotated. Operators should keep their hands on the OTS handle and keep patient's clear while rotating the tube.**

Adjust the Overhead Tube Suspension (OTS) Position

⚠

WARNING: **When moving WS, OTS would track WS automatically. To keep people away from OTS at this moment for OTS might hit people.**

The OTS components can be moved in several directions to properly position the unit during a patient examination. The User Interface is used to control the motions. Use this procedure to learn how to position the OTS.

NOTE: The steps of this procedure can be performed in any order and not all of the steps are required. You do not have to follow this exact sequence. This procedure is intended to help you learn the various methods of positioning the OTS.

1. Use the Longitudinal Lock Release button to move the OTS along the bridge of the overhead rail system.
   a) Press and hold the Longitudinal Lock Release button on the OTS console.
   b) Move the OTS to the desired position.
   c) Release the Longitudinal Lock Release button.
2. Use the Vertical Lock Release button to move the telescopic column up and down.
   a) Press and hold the Vertical Lock Release button on the OTS console.
   b) Move the telescopic to the desired vertical position.
   c) Release the Vertical Lock Release button.

3. Use the Lateral Lock Release button to move the OTS carriage from side to side on the bridge.
    a) Press and hold the Lateral Lock Release button on the OTS console.
    b) Move the OTS carriage to the desired position.
    c) Release the Lateral Lock Release button.
4. Use the All-Lock Release sensor to simultaneously move the OTS in vertical, lateral and longitudinal directions.
    a) Grasp the bulgy part of the OTS console bar to active the infrared sensor.
    b) Move the OTS to the desired position.
    c) Release the OTS console bar.

NOTE: When pressing a single direction movement button (lateral e.g.) and grasping the bugly part of the OTS console bar at the same time, you can only move the OTS along one direction but cannot active the all lock release sensor.

IMPORTANT!: When searching for detents, please move the OTS slowly when the OTS is close to the detent indicators on the rails.

Multi-Leaf Collimator

The multi-leaf collimator allows you to adjust the radiation field size to the anatomy (Figure 4-19 and Table 4-6). This collimator can be used in either the manual or automatic mode. This section describes the controls and basic features of the collimator.

Figure 4-19 Multi-leaf collimator controls

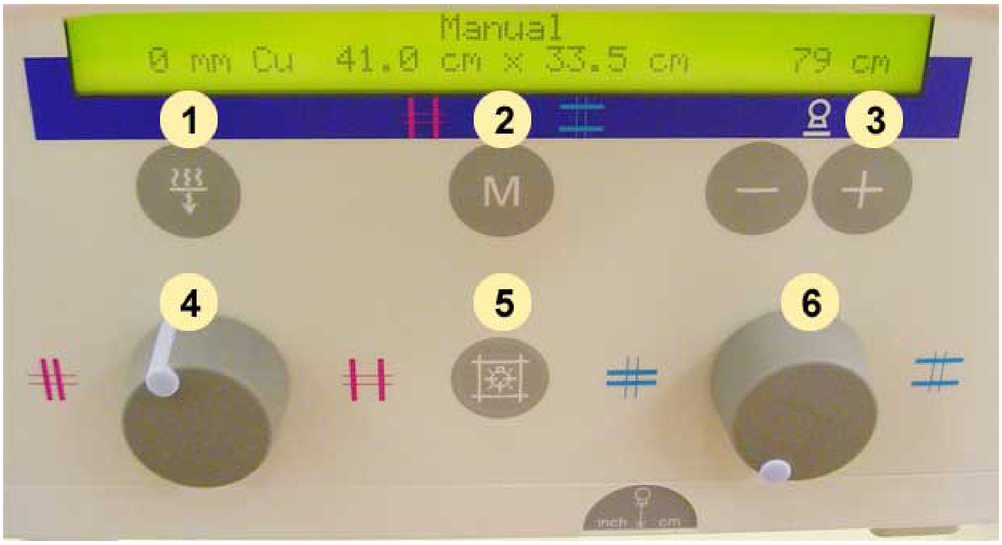


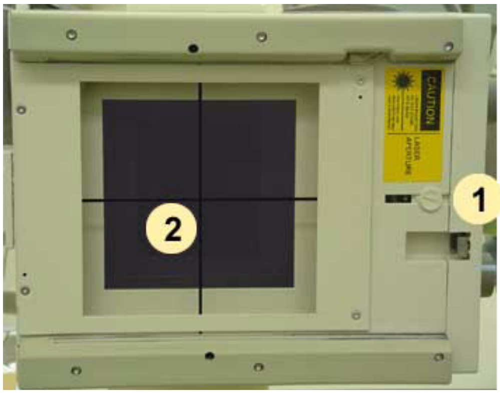
Table 4-6 Multi-leaf collimator controls

Item	Description
1. Spectral Filter Selection	Displays the spectral filter selections. The options are 0, 0.1, 0.2 and 0.3 mm of Cu. Press the button to change the filtration.
2. Message	Displays messages when Exposure Hold is active, by providing information concerning the positioner interlock(s) that is/are disabling the exposure. If there is no Exposure Hold, displays the size of the collimation field (FOV).
3. SID display	Displays the current Source Image Distance. Press the [+] and [-] buttons to switch the SID between 100 and 180 cm (40 and 72 in).
4. Lateral collimator field size	Adjusts the lateral field size. Turning the dial to the left closes the collimator, turning to the right opens the collimator.
5. Collimator light switch	Turns the collimator light on and off. Cutout can also be performed automatically via an internal time switch. The operating time can be configured in steps of up to 90 seconds.
6. Vertical collimator field size	Adjusts the vertical field size. Turning the dial to the left closes the collimator, turning to the right opens the collimator.

Collimator Field and Linear Laser Lights

The collimator light switch toggles both the centering cross and the linear laser lights on and off (Figure 4-20). The centering cross is used to display the longitudinal and transverse axis of the exposure field on the digital detector or directly on the patient. This identifies the field that will be exposed. The linear laser light provides an axis mark, which is lined up with the centering mark on the handle of the digital detector. This allows you to verify that your collimator is centered with the detector. The laser light slider is used to open and close the aperture for the laser light, allowing you to show or hide the laser beam.

Figure 4-20 Collimator lights



1. Linear laser light aperture and slider
2. Centering cross light

WARNING: **Laser radiation. Peak power 1 mw / wave length 540-700 nm / class II laser product. Do NOT stare into beam! When you switch on the linear laser light localizer, make sure no person looks directly into the laser to avoid eye injuries or impaired vision.**

Automatic or Manual Collimator Modes

The automatic collimator mode allows you to select preset collimation field sizes. When in the manual mode, you must manually adjust collimator knobs and set the field size. In the Tabletop application, the manual mode is always active.

In the Digital Table application,manual mode is active when:

- ABS (Tube Angulation) is < 10 degrees
- 90cm < SID < 130cm
- Tube is not positioned over the table

In the Wall Stand application, manual mode is active when:

- Tube Angulation is < 90 (±10) degrees or > 80 degrees with the wall Stand in the vertical position
- ABS (Tube Angulation) is < 10 degrees with the wall stand in the horizontal position.

NOTE: In order to check automatic collimation functionality, switch to automatic mode, then select an FOV dirrent from current size, check FOV is automatically adjusted to the newly selected FOV;

NOTE: You can undersize the current automatically adjusted FOV by manually turn the collimator knobs located on the colliamtor front user interface.

Multi-leaf Collimator Display

The multi-leaf collimator has an ACSS display that provides information about the collimator. Figure 4-21 and Table 4-7 explain the information displayed on the collimator.

Figure 4-21 Multi-leaf collimator display

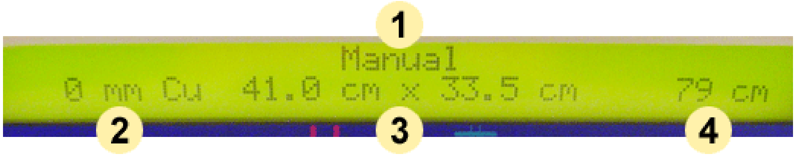


Table 4-7 Multi-leaf collimator display

Item	Description
1	X-ray Field of View (FOV) • PBL = automatic format collimation system • Manual = manual mode of collimation
2	Spectral Filter Selection display
3	Width and Height display of collimated X-ray field
4	Film-Focus Distance (SID) display

NOTE: The display of the SID and collimator FOV can be configured for either English or metric units.

OTS Collimator Exposure Inhibit Conditions

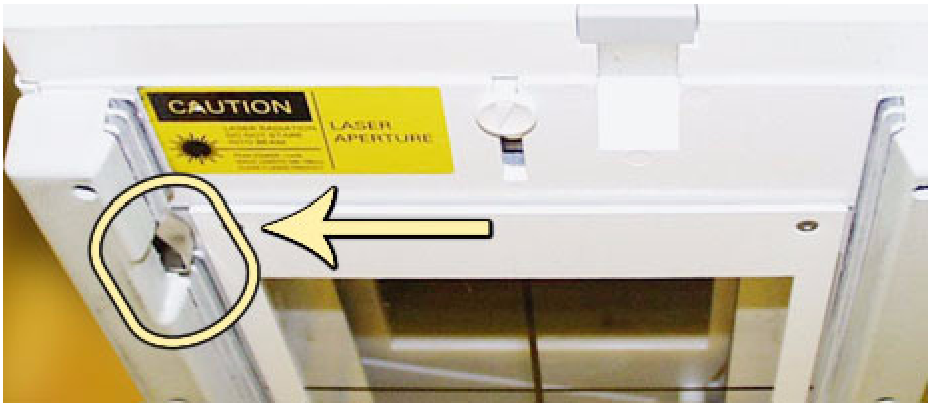
The collimator will display messages indicating an inhibit condition that must be cleared before exposures can be taken.

Locking Lever

The locking lever (Figure 4-22) locks the compensating filters, templates, etc. inserted in the accessory rails of the multi-leaf collimator in place to prevent them from falling out.

NOTE: To remove an accessory from the collimator, the locking lever must be pressed in until the compensating filter, templates etc., can be removed.

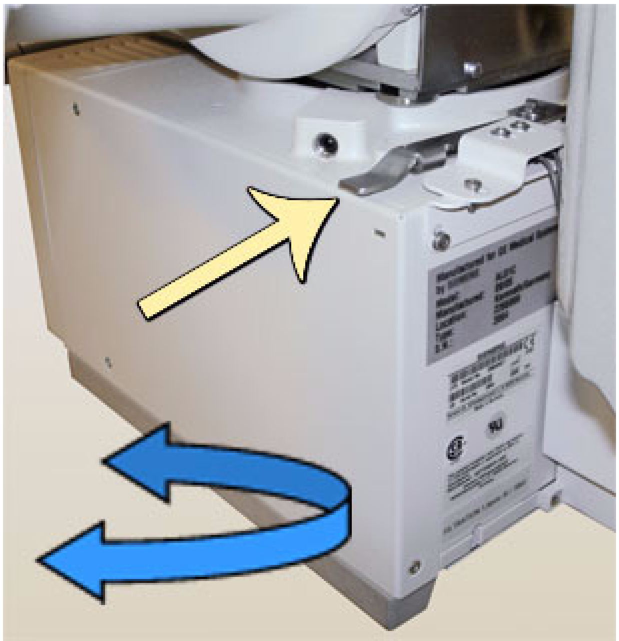
Figure 4-22 Collimator locking lever



Rotating the Multi-leaf Collimator

The collimator can be rotated 90 degrees around the vertical axis, by releasing the collimator locking lever (Figure 4-23). This allows you to line the collimator field up with the anatomy to be exposed. This function is especially useful when imaging extremities.

Figure 4-23 Rotating the collimator



For certain exams, such as extremities, you may need to line the collimator field up with the anatomy to be exposed. Use this procedure to rotate the multi-leaf collimator around the vertical axis.

1. Move the locking lever on the multi-leaf collimator toward the front panel, i.e. toward you. This releases the collimator from the 0 lock-in position.
2. Grasp the multi-leaf collimator with both hands.

3. Rotate it to the desired angle and direction.
4. Return the locking lever to its original position. This prevents further rotation.

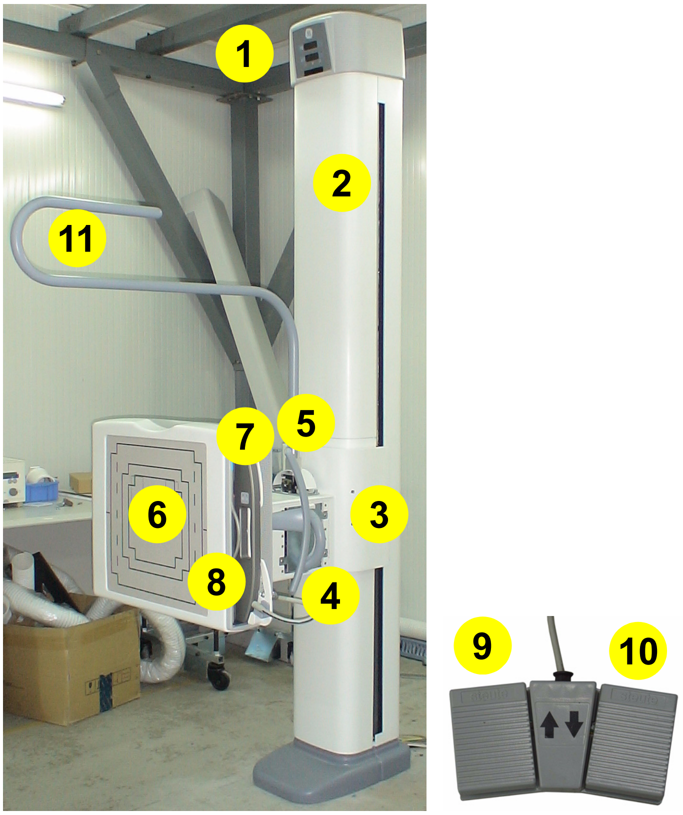
NOTE: When the collimator is rotated, the image border is adjusted to the maximum size based on the selected collimator field of view (FOV).

WARNING: **Always grasp the multi-leaf collimator in such a way that neither hand can be pinched or crushed between the handles and the collimator.**

Digital Wall Stand

The digital wall stand (Figure 4-24) contains the digital detector, which can be moved to accomplish different radiographic procedures. You have the choice of acquiring images with or without the grid. Grid exams require inserting the proper grid. Grids are stored in the wall mounted accessories box. To remove the grid, use the handle of the grid out of the wall stand or accessories holder. To insert it, slide the grid through the groove at the lateral side of the wall stand or through the groove on the top of the accessories holder until it rests completely in slot. An interlock within the detector senses the new grid. If the incorrect SID is attempted, exposures are not permitted. Photo-timing is controlled using a three cell ion chamber similar to the device used in conventional radiographic systems.

Figure 4-24 Wall stand



The Wall Stand consists of the following major elements:

1. SID and Grid type display LED
2. Wall Stand Column
3. Extension Arm
4. Handle and Knob
5. Hand grip (PA Bar)
6. Detector flat panel
7. Detector
8. Grid
9. Ascending foot Pedal
10. Descending foot Pedal
11. Lateral Positioning Bar

The digital wall stand is equipped with a lateral positioning bar (Figure 4-31) to aid in patient positioning. Positioning of the Digital Detector is accomplished by using the handheld control (Figure 4-31). Care should be taken when placing lead markers on the detector to ensure proper visualization on the digital image. Refer to *Chapter 5: General Information - Lead Markers* for lead marker information.

NOTE: There are two kinds of extension arms: standard arm to 2D systems, extended arm to 1D systems.

Wall Stand Characteristics:

- The vertical height of the detector is adjustable to facilitate proper positioning.
- The tilt feature allows you to tilt the detector –20° to +90° in order to acquire extremity or special imaging exams.
- Positive beam limitation (automatic collimation) is available at 102cm (40 inches), 130cm (51 inches) and 183cm (72 inches) SID for 0 degree tilt, and 102cm (40 inches) and 130cm (51 inches) SID for 90 degree tilt. Adjustments outside this range require manual collimation.
- Exposures can be made with the detector tilted at any angle.
- AEC is available at any SID or detector tilt at 0° or 90°.

- The inherent filtration of the wall stand front panel is less than 0.7 mm of aluminum equivalent at 100 kVp.

IMPORTANT!: There is a table detent indicator on the wallstand column, check this position before a table application.

NOTE: You should instruct your patient to use the lateral bar and the hand grips (PA bar) when you are positioning the patient at the wall stand.

IMPORTANT!: When pulling down the wallstand manually for table application, slow down when it is closed to the table detent position to reach the detent easily .

CAUTION: **Make sure your patient does not use the wall stand as a support. The wall stand is not a weight bearing device.**

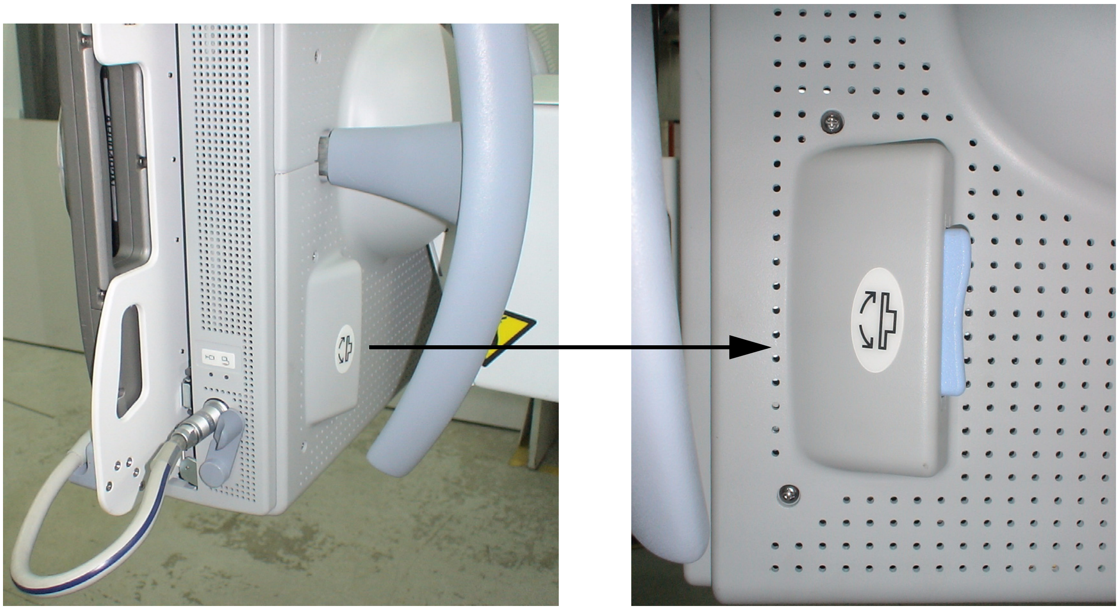
CAUTION: **If the patient leans on the wall stand with enough force, the locks may be released and the receptor will be lower slowly.**

CAUTION: **Grid handling: Handle grids with care and place in accessories holder when not in use. Dropping the grid could cause damage and reduced image quality. Be cautious when positioning wheelchair patients as the handgrips extend and can cause a pinch point.**

Detector Tilting

When the wall stand is tilted, you can do multiple exams in a horizontal position. The wall stand can be used for multiple exams; it is important to keep the patient's extremities away from the pinch areas (Figure 4-25, Figure 4-26 and Figure 4-27).

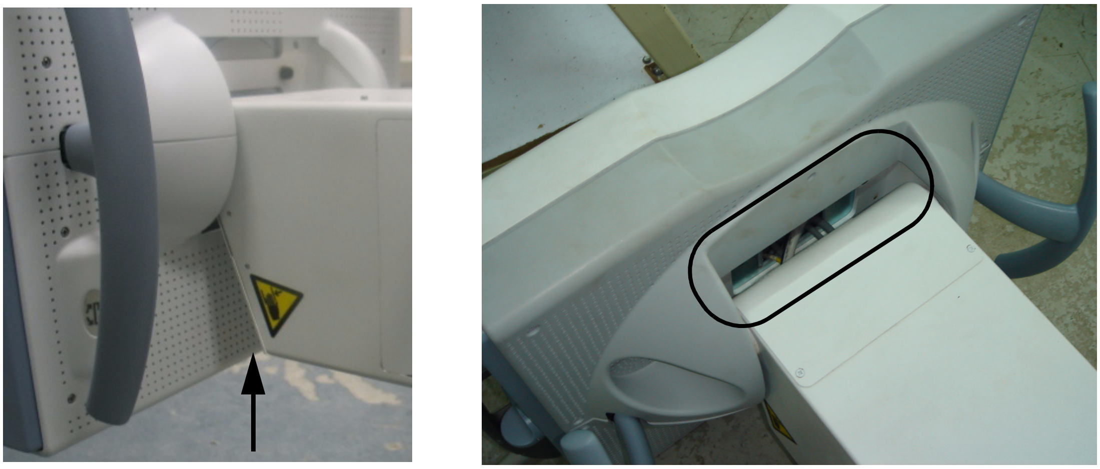
Figure 4-25 Vertical and tilt manually controls



The tilt lock release button is located in the lower corner of the back of the detector. Detents for the detector tilt are located at 0° (vertical) ,90° (horizontal) and -20°.

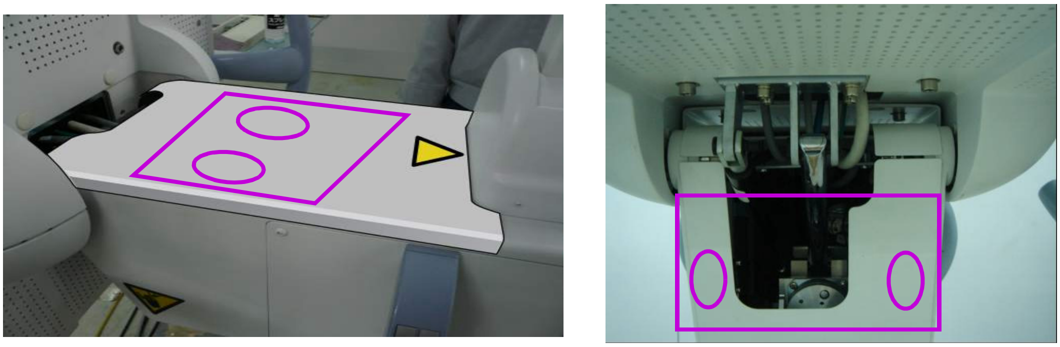
The Wallstand tilting can be done by pushing the buttons at the two lateral sides of the Wallstand extension arm.

Figure 4-26 Pinch area



There are four switches in the crcle areas under the white bracket. When the operator's or patient's hands are put on the bracket in the two rectangle areas during wall stand detector housing tilting, the switches will be activated and the tilting movement will be stopped.

Figure 4-27 Pinch switches



WARNING: The Wall Stand detector housing assembly could reach the floor for certain X-ray examinations. Special cares are required when you move it down to the floor level to avoid possible collisions with floor or any other objects or even human bodies. Otherwise, damage to this equipment or injury to people could occur.

WARNING: Tilting and vertical motion of the wall stand detector housing assembly is electrically powered (motorized vertical motion is an optional feature). Always pay special attentions to avoid it to hit people.

WARNING: Wall stand detector housing assembly could automatically track the vertical motion of OTS. Always make sure people are out of the movement area when you move OTS vertically.

WARNING: Always position wall stand detector assembly manually for minor adjustments when patients are positioned on it.

WARNING: Always remind people not to lean on the Wall Stand detector housing assembly for balance. The lateral bar and PA bars are not intended to support patients' weights for balance. The detector housing assembly could move suddenly and people could fall down due to out-of-balance.

⚠

CAUTION: Don’t put baby directly on the wall stand front panel.

⚠

CAUTION: Patients should be clear of the wall stand when tilting is in process.

⚠

CAUTION: Make sure your patient does not use the handgrips for support.

⚠

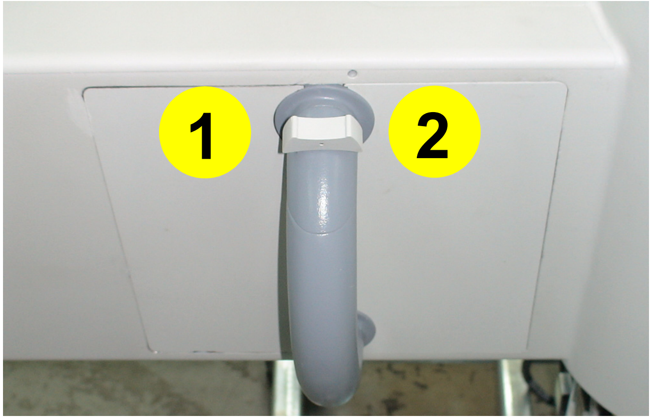
CAUTION: Be careful about the handgrips that stick out below the wall stand when positioning wheelchair patients under the wall stand.

Detector Vertical Movement

To use the buttons at the two lateral sides of the wall stand extension arm to lift the wall stand up and down, or can step the foot pedals to descend or ascend the wall stand automatically.

Vertical Movement Control Button

Figure 4-28 Vertical movement control button

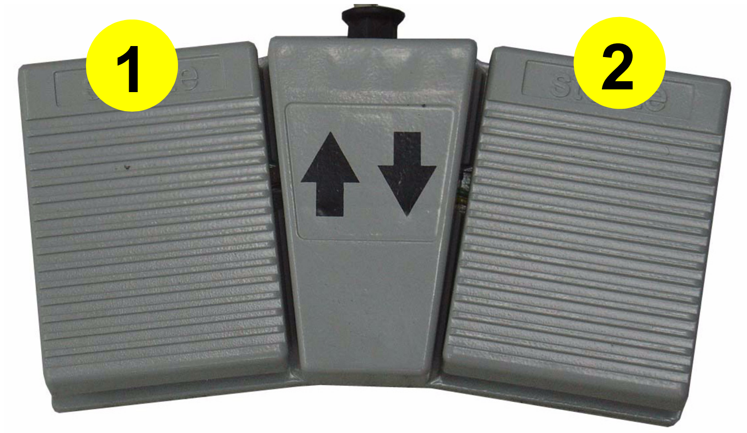


1. Up
2. Down

Foot Pedals

1. Press and hold a pedal to move the detector in the desired direction.
2. Release the pedal to stop movement.

Figure 4-29 Foot pedals



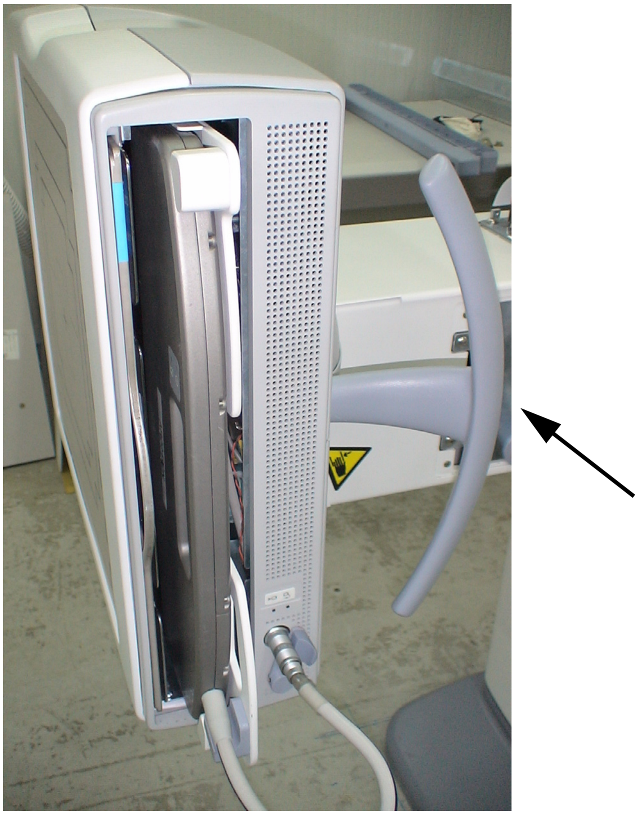
1. Up
2. Down

NOTE: Recommend to descend (ascend) the wall stand by the foot pedals and tilt the wall stand by buttons at the same time to save the time when the wall stand horizontal application is desired.

Hand Grip (PA bar)

Operator should instruct the patient to use the hand grips to extend the scapulas fully when doing a Chest PA exam.

Figure 4-30 PA bar



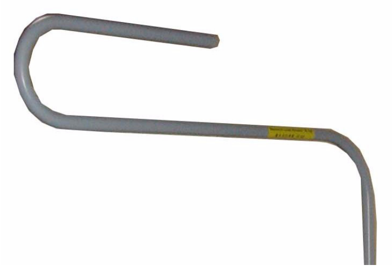
CAUTION: **Make sure your patient does not use the handgrips for support.**

CAUTION: **Be careful of the handgrips that stick out below the wall stand when positioning wheelchair patients under the wall stand.**

The Lateral Positioning Bar

The lateral positioning bar allows for greater patient stability when performing exams in the upright position. The lateral positioning bar is located at the lateral side of the Wallstand extended arm.

Figure 4-31 Lateral positioning bar



Remove and Attach the Lateral Positioning Bar

The positioning bar should be removed or tilted to the horizontal postition before stretcher table application.

Use this procedure to remove or tilt or attach the lateral positioning bar.

To remove the lateral bar, grasp the bar and lift it up.

To tilt the lateral bar, grasp the bar and lift it up a little then tilt the bar to the horizontal position.

To attach the lateral bar, grasp the bar and center the bar to the tray then insert it on the tray.

⚠

WARNING: When descending the wall stand with the lateral bar, be cautious the bar not hit the patient's head!

⚠

WARNING: Please remove lateral bar when ascending the wall stand for a tall patient in case the lateral bar might hit the ceiling.

⚠

WARNING: The lateral bar is not a patient support bar. It will not support the weight of your patient. It is a non weight-bearing positioning aid only.The maximum load of the lateral bar is 30Kg.

⚠

CAUTION: If the patient pulls on the lateral bar with enough force, the locks may be released and the receptor will be lower slowly.

CAUTION: **Use care not to drop lateral bar when handling. Place on accessories holder when not in use.**

CAUTION: **When you are at the minimum SID, remove the lateral bar.**

Lateral Positionining Bar Application

The lateral positioning bar can be rotated and oriented.

Operator Override Switch

The Operator Override Switch lets you offset the tube from the detector. This means the tube will no longer track to the wall stand. This part is necessary for some special X-ray procedures.

Tube Warm-up Misalignment

CAUTION: **Before the tube warm-up, please move the tube outside the valid area of the detector to prevent the detector from receiving useless x-ray.**

Upon receipt of the TUBE WARM-UP signal from the positioner controller, the OTS servo controller makes the In Position feedback signal inactive. If the Wall Stand detector position is greater than the midpoint of its travel, the OTS moves the X-ray tube focal spot down to 250 mm below the center point of the detector. If the Wall Stand detector position is less than the midpoint of its travel, the OTS moves the X-ray tube focal spot up to 250 mm above the center point of the detector. When the X-ray tube and detector are successfully misaligned, the position feedback signal becomes active. The drive speed is the same as in the normal tracking mode. Motion in this mode is interlocked with the Motion Enable signal.

Vertical Drive Manual Override

The OTS allows for manual positioning of the X-ray tube for unique non-aligned exposures. This feature could also be used if the detector tracking function were inoperable, as would be the case if the position feedback from the Wallstand or OTS were defective.

Remote Control

The remote control (Figure 4-32) is placed in the holder mounted on the side of the wall stand column and allows you to set the field of view, manually collimate, or enable the collimator lamp. Refer to Table 4-8 for detailed information.

Figure 4-32 Wall stand remote control

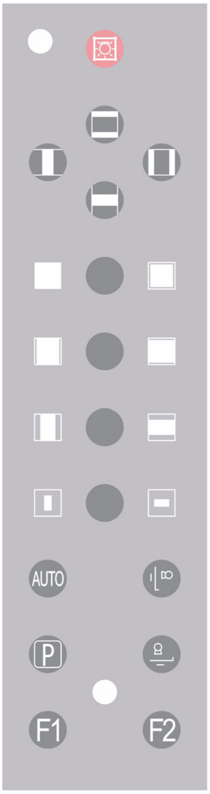


Table 4-8 Remote controls

Item	Description
1. Collimator lamp Control	This controls lamp illumination. Pressing once turns on the lamp for 30 to 60 seconds. Pressing again, while lamp is illuminated, shuts the lamp off.

Item	Description
2. Default FOV selection buttons	Each of these four buttons control 2 FOV at the same time. Press one button once is to select the fov of the left side on the button, press again is to select the fov of the right side on the button. The selection order is as follow(left to right, up to down): • 41x41 cm (16x16 inch) 35x35 cm (14 x 14 inch) • 35x41 cm (14x16 inch) 41x35 cm (16 x 14 inch) • 24x30 cm (10x12 inch) 30x24 cm (12 x 10 inch) • 18x24 cm (8x10 inch) 24x18cm (10 x 8 inch)
3. Auto Positioning Buttons	If enabled, moves the tube to one of 4 pre-defined positions. If Auto Positioning is not enabled, the buttons do not function.
4. FOV inching switch	

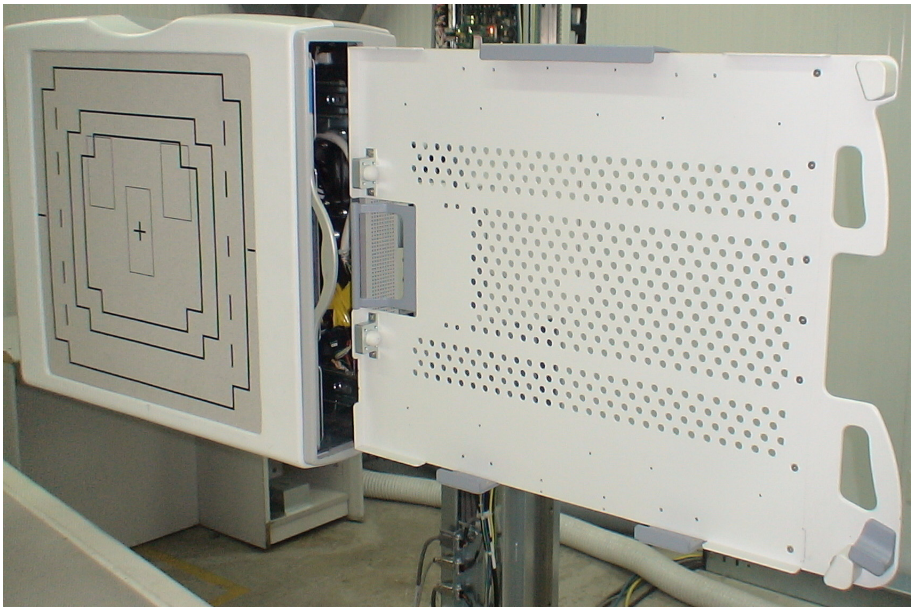
Detector Loading/Removal

⚠

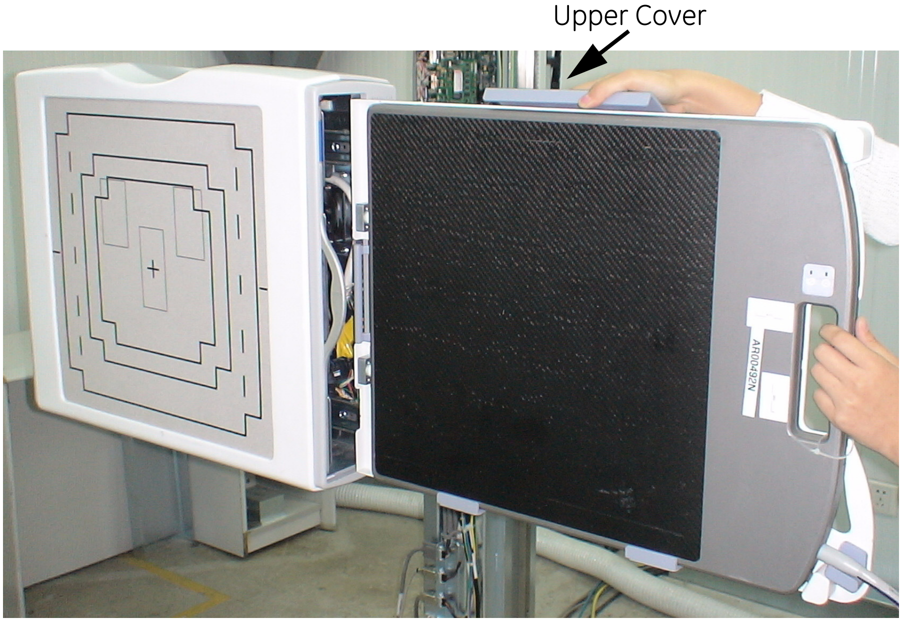
WARNING: Please load/remove the detector carefully to avoid the detector's falling down.

Detector Loading

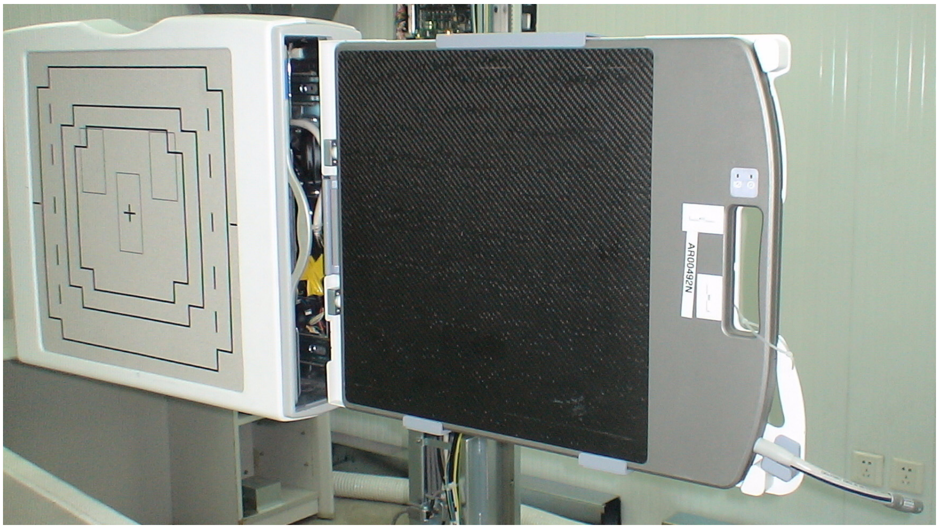
1. Pull out the detector tray.



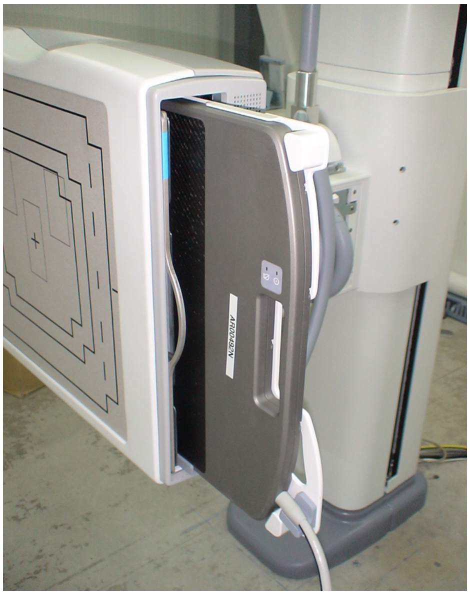
2. Flip up the upper cover, and install the detector.



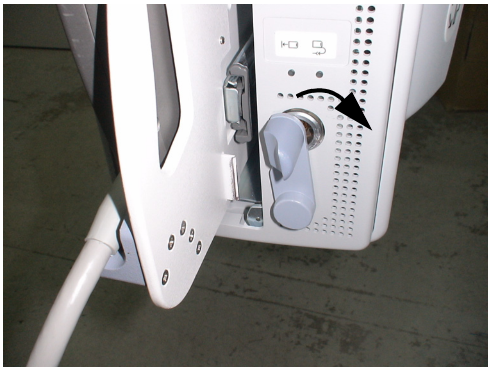
3. Flip down the upper cover to fix the detector.

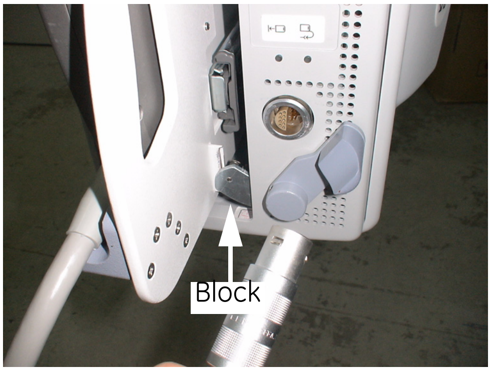


4. Push in the detector tray.

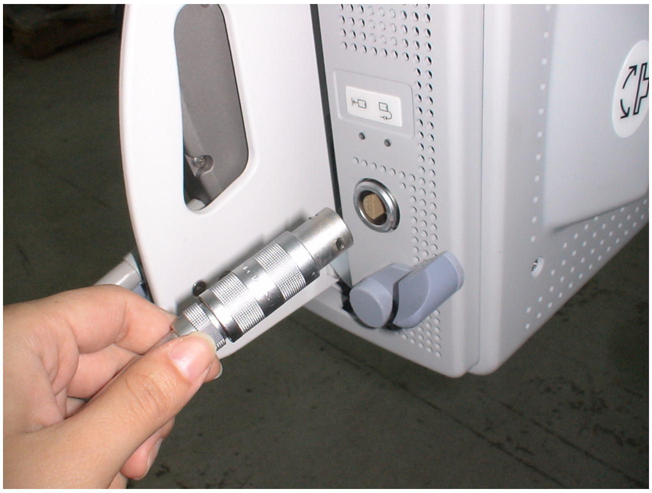


5. Turn on the detector lock to fix the detector tray with the block.



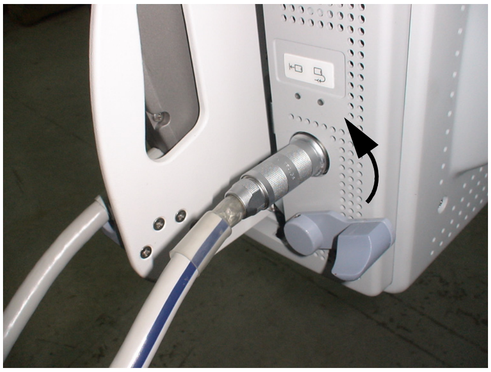


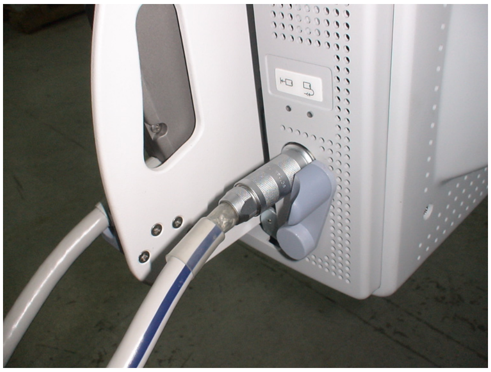
6. Connect the detector cable.



NOTE: Connect the cable with two red dots leveling.

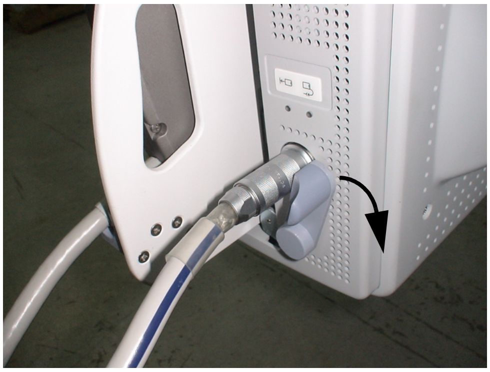
7. Turn back the detector lock.

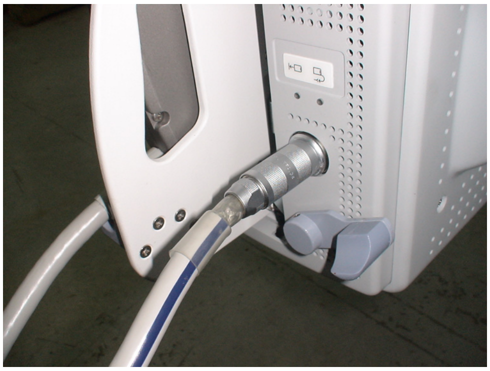




Detector Removal

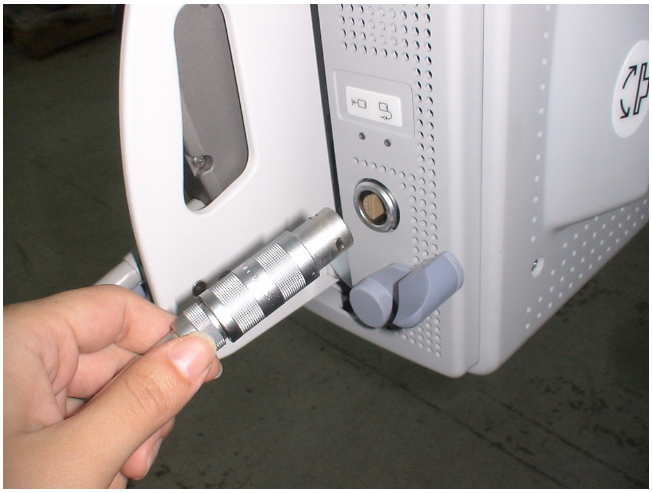
1. Turn on the detector lock.



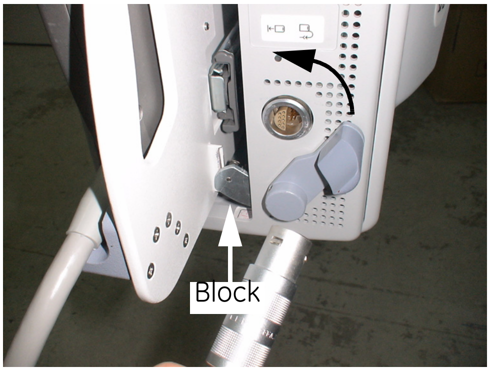


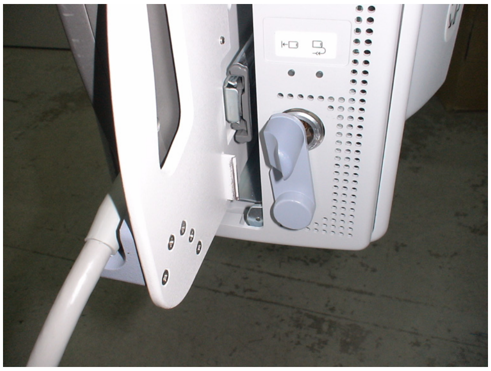
2. Disconnect the detector cable.

NOTE: Hold the plug's metal wrap,and pull out the plug, or the cable cannot be disconnected.

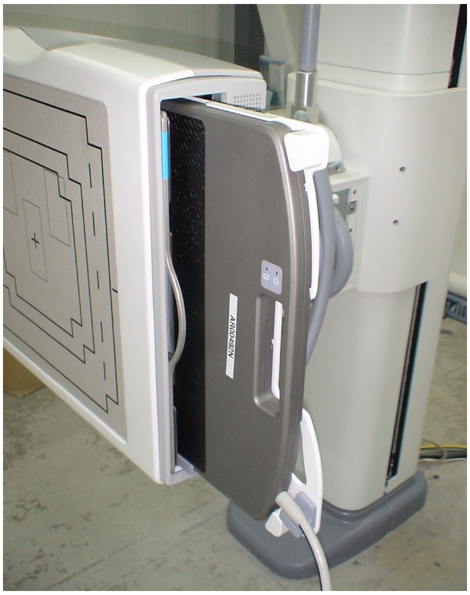


3. Turn back the detector lock to hide the block.



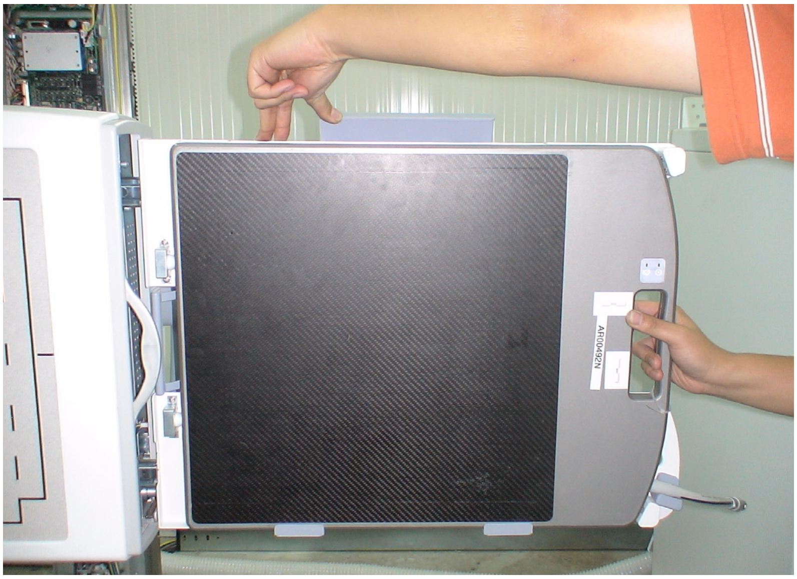


4. Pull out the detector tray.

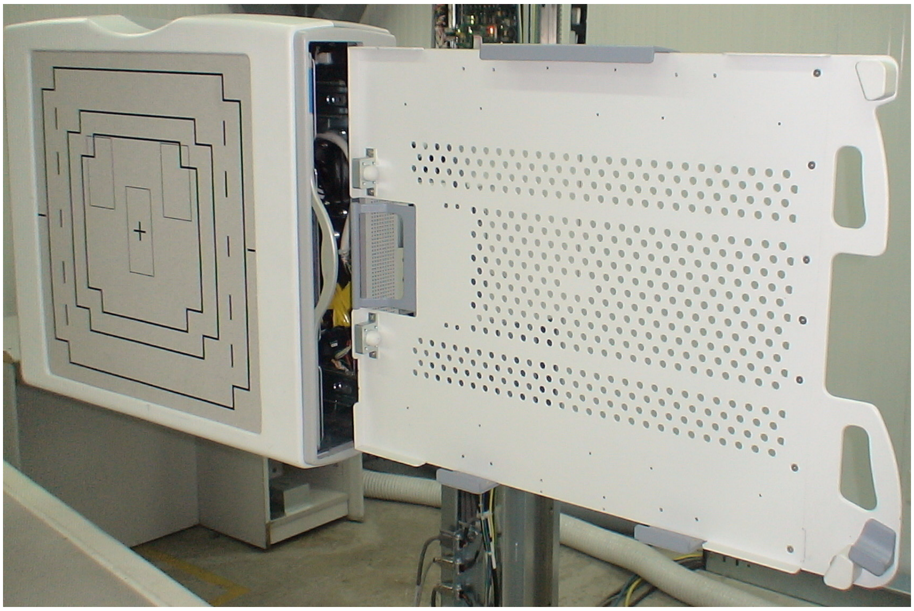


5. Flip up the upper cover, and remove the detector.

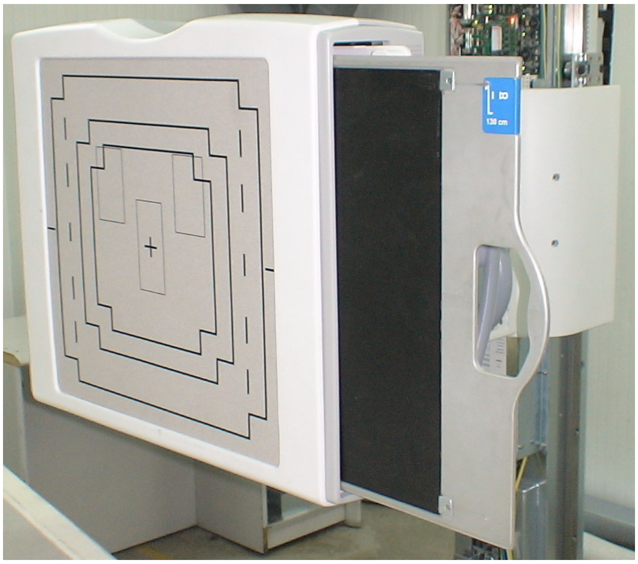
NOTE: When remove the detector, separate the detector and detector tray while flipping the upper cover.



6. Flip down the upper cover, and Push in the detector tray.



Grid Loading/Removal



Digital Table

The table includes the digital detector, removable grid, foot pedals, and Emergency Stop buttons.

Figure 4-33 Digital table

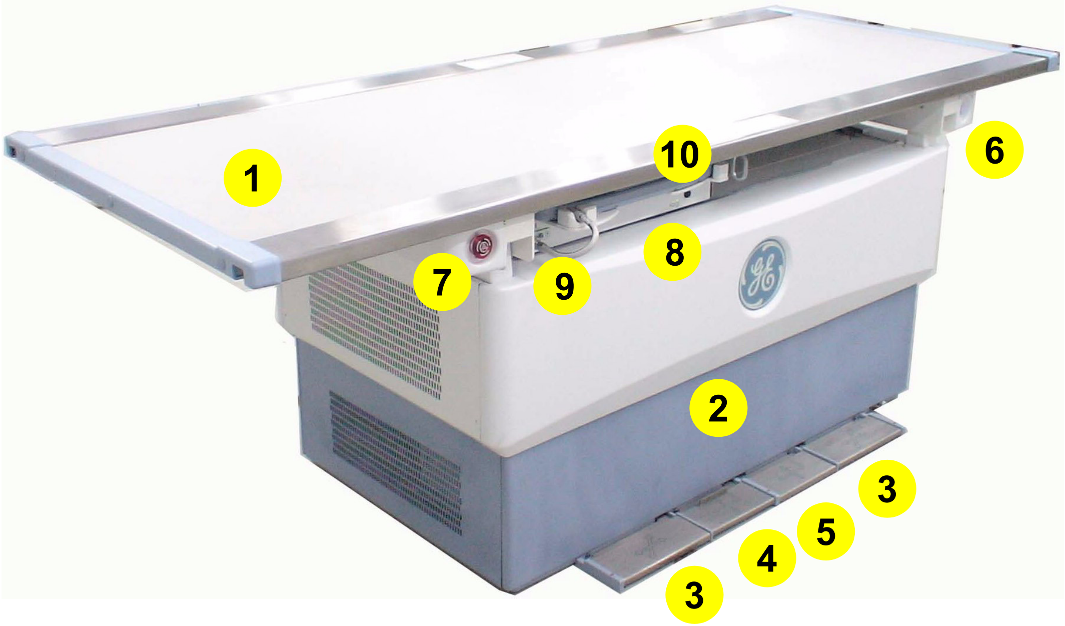
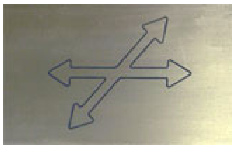
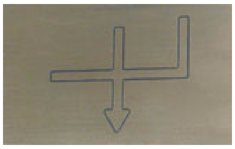
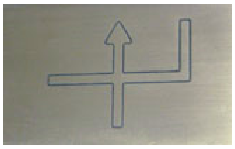


Table 4-9 Digital table components

Item	Description
1. Table top	The table dimensions are 2,100 mm (83.0 in) in length and 840 mm (33.0 in) in width. Its inherent filtration is less than 0.75 mm of aluminum equivalent at 100 kVp. The tabletop can be moved longitudinally and transversely for easy patient positioning. Even when it is fully extended, it can support a supine patient weighing up to 200 kg (440 lbs.).
2. Elevating Base with Telescopic Covers	The elevating base raises the tabletop to a maximum height of 820 mm (32.0 in) and lowers it to a minimum height of 520 mm (20.0 in) (+/- 10mm). The telescopic covers are assembled in two levels. Their purpose is to cover the table power supply and the electronic and mechanical components located in the table base. This is essential when the tabletop is raised or lowered.
3. Table Positioning Foot Pedals 	This pedal allows you to move the table in all directions: longitudinally and transversely. This is known as a floating tabletop. Press the pedal twice and hold down to move the table top.

Item	Description
4. Down Pedal 	The Down pedal lowers the digital table down. Press the pedal twice and hold down to lower the table.
5. Up Pedal 	The Up pedal raises the digital table up. Press the pedal twice and hold down to raise the table.
6. Positional Buttons	There are two lock buttons located on the side on the table, near the head and foot of the table. They are used to prevent the table up-down and tabletop movement. The lock is engaged and table will be unmovable when the button is lit. The movements controlled by foot pedals will be enabled when the button is unlit. When the safety sensor is active, like infrared sensor for finger-pinch, the light will flash.
7. Emergency Stop Buttons	There are two Emergency Stop buttons located on the left and right sides of the table. These buttons are used to remove power from the table in an emergency.
8. TRAD Detector Housing & Grid Tray	Located under the table top, and used to hold detector and grid.
9. TRAD Detector Connector	Used to connect detector cable.
10. Manual Button	There is one manual button located on the front of housing cover. Press this button, the housing can be move by manually. And release this button, the housing can be driven by motorized made.

NOTE: The table is equipped with a collision detection system. If contact is made between the tabletop and a foreign object, such as a stool, while lowering the tabletop, the requested motion automatically stops until the collision condition is removed. This is accomplished by either clearing the foreign object from the tabletop movement path or by requesting the reverse movement of the tabletop.

WARNING: When the Manual Detector Position Button is pressed, the automatic detector tracking mechanism is disabled. To re-enable automatic detector tracking, move the OTS.

WARNING: Before your patient gets onto or off from the digital table, always press the Table Positional button to block the foot pedal functions momentarily. This avoids injuries to the patient or damage to the equipment if a foot pedal is accidentally stepped on.

NOTE: To avoid unexpected operations, the Table Positional button is auto enabled unless the system powers up.

WARNING: To avoid injury to fingers and hand of patient and operator caused by table movement, hands must be kept away from table top edges at all times.

WARNING: The longitudinal movement speeds up while table top loads patient. To avoid collision injury, please insure there is no other people in the field table top could reach.

WARNING: Never put your foot or toe right underneath the descending table outer covers, and at the same time, make sure patients' or other people's foot or toe is also out of the hazardous areas. Otherwise injury could occur.

WARNING: The detector housing underneath the tabletop is a motorized part, and it will automatically move during homing or auto-tracking operation. Special attentions should be taken when you move the OTS longitudinally to ensure the moving housing will not hurt people.

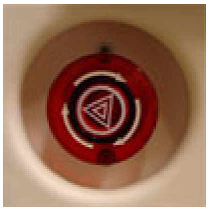
WARNING: **Never stretch arm or hand into the cavity underneath the tabletop which provide room for the moving detector housing. There is no operator serviceable parts there.**

Use the Emergency Stop Button

The digital table is equipped with Emergency Stop buttons located on the left and right side of the table. Use this procedure to perform an emergency stop and to reset the Emergency Stop button.

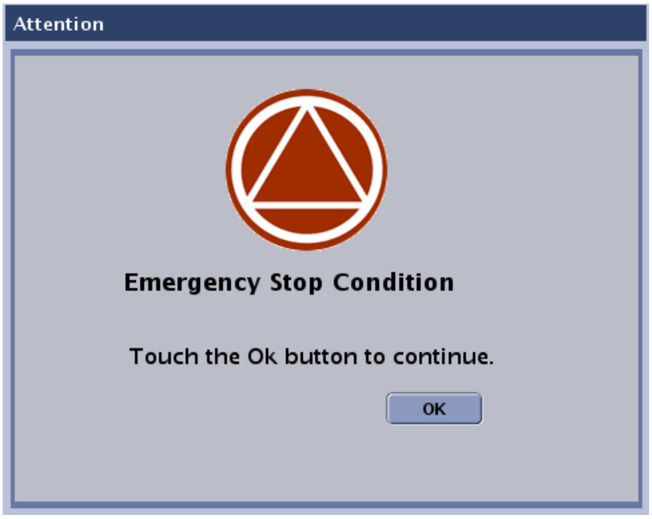
1. In an emergency situation, press the Emergency Stop button in with force.

Figure 4-34 Emergency stop button



2. Emergency Stop screen pops up.

Figure 4-35 Emergency stop screen



Attention

Emergency Stop Condition

Touch the Ok button to continue.

3. Resolve the emergency situation.
4. When normal conditions are confirmed, turn the button clockwise.
5. At the Acquisition Workstation, click the [OK] button on the Emergency Stop screen (Figure 4-35). Emergency Stop Recovery screen appears.

Figure 4-36 Emergency stop recovery

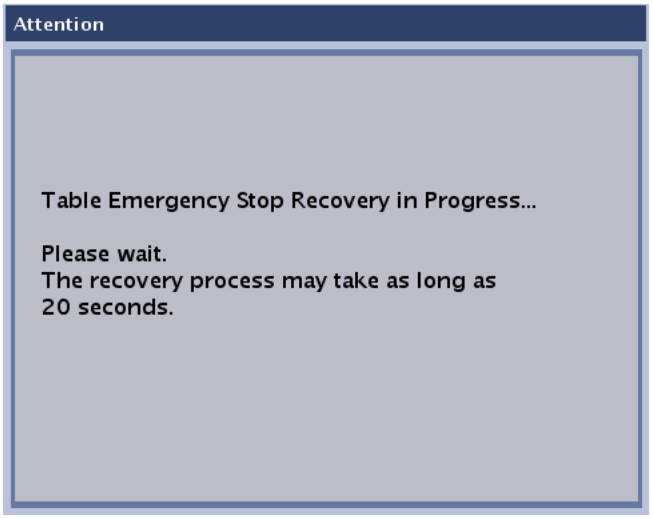


Table Emergency Stop Recovery in Progress...

Please wait.
The recovery process may take as long as
20 seconds.

- The system will power up automatically.

WARNING: When the Emergency Stop button has been activated, the table will move freely. The table is not locked into position. Exercise extreme caution with your patient when this happens.

Raise and Lower the Digital Table

The height of the digital table can be adjusted to make it easier for your patient to get on and off the table and for you to position the patient for the examination.

WARNING: Before your patient gets on or off the digital table, always press the Table Positional button to block the control foot pedal functions momentarily. This avoids injuries to the patient or damage to the equipment if a foot pedal is accidentally stepped on.

Use this procedure to raise and lower the digital table.

1. Release the table lock, if necessary.
2. To raise the table, press the Up pedal two consecutive times. This activates the foot pedal.
3. Hold the foot pedal down until the desired height is reached.

NOTE: The tabletop automatically stops when it reaches its maximum height of 820 mm (32.0 inches).

4. Remove your foot from the pedal to stop the movement.
5. To lower the table, press the Down pedal two consecutive times.
6. Hold the foot pedal down until the desired height is reached.

NOTE: The tabletop automatically stops when it reaches its minimum height of 520 mm (20.0 inches).

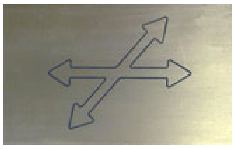
7. Remove your foot from the pedal to stop the movement.

Position the Table Longitudinally and Transversely

The digital table position can be adjusted in the longitudinal and transverse directions for greater patient positioning flexibility. Use this procedure to position the tabletop in the longitudinal and transverse directions with respect to the X-ray tube.

1. Release the table lock, if necessary.
2. Press the either outer foot pedal (Figure 4-37) two consecutive times. This activates the foot pedal.

Figure 4-37 Table top positioning foot pedal



3. Hold the foot pedal down and position the table top.
    - You can float the table top in all directions while the pedal remains held down.
4. Manually move the tabletop in a longitudinal or transverse direction to the desired position.
5. Release the foot pedal to lock the tabletop.

WARNING: **When moving the tabletop, be careful of where your and the patient's fingers are placed. Do not attempt to move the tabletop without using the foot pedals to release the longitudinal and transverse movement locks.**

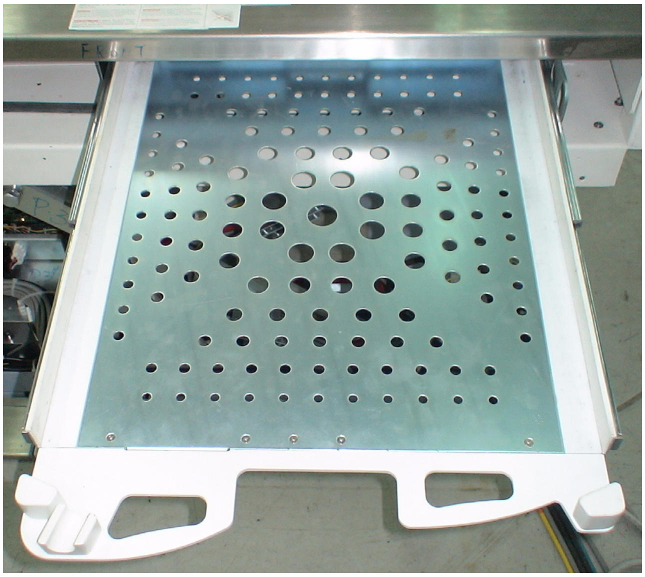
WARNING: **To avoid injury to fingers and hand of patient and operator caused by table movement, hands must be kept away from table top edges at all times.**

Detector Loading/Removal

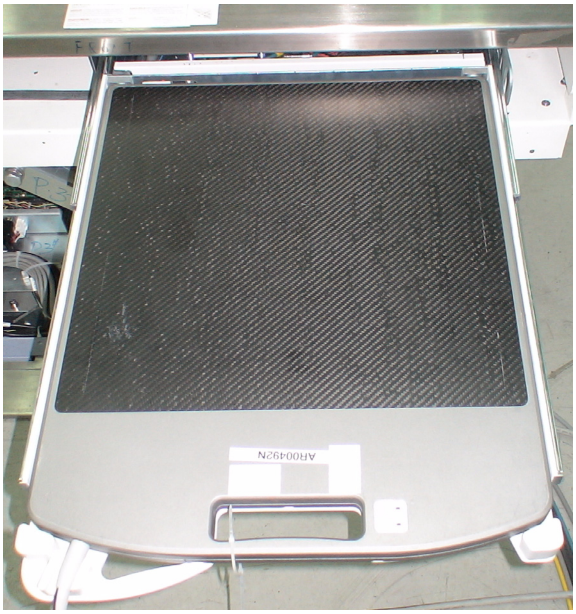
WARNING: **Please load/remove the detector carefully to avoid the detector°Øs falling down.**

Table Detector Loading

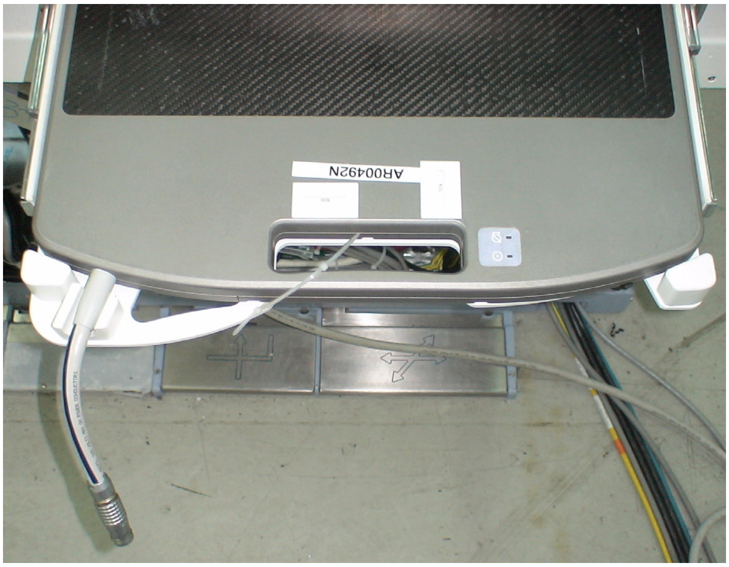
1. Pull out the detector tray.



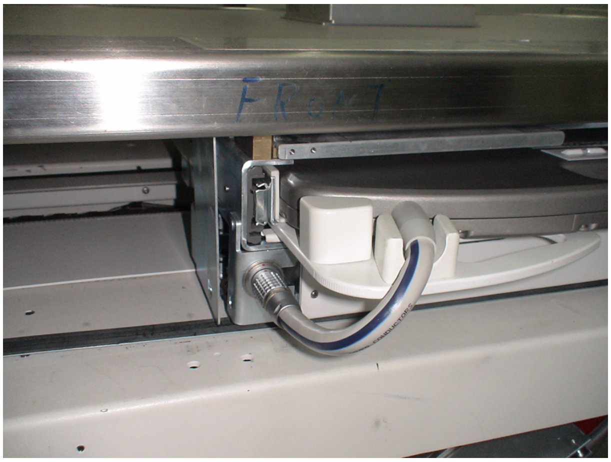
2. Install the detector.



3. Push in the detector tray.



4. Connect the detector cable.



NOTE: Connect the cable with the two red dots leveling.

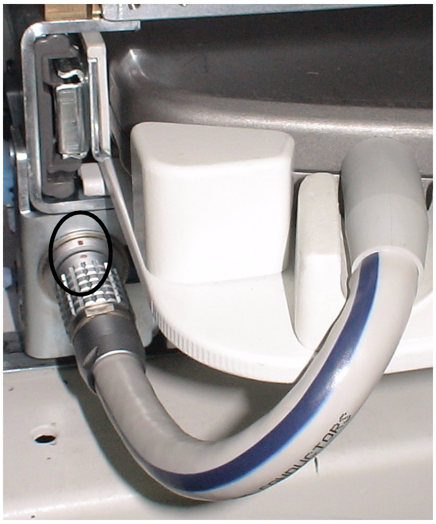
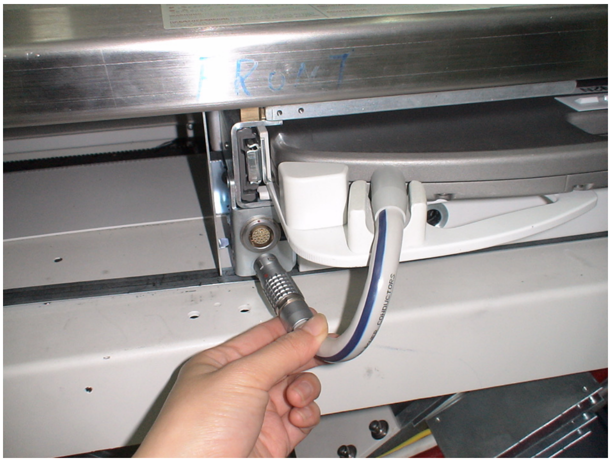


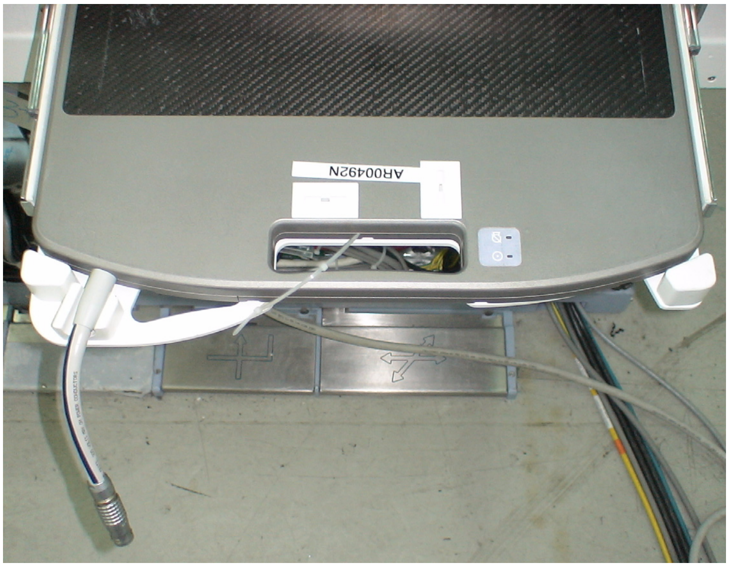
Table Detector Removal

1. Disconnect the detector cable

NOTE: .Hold the plug's metal wrap,and pull out the plug,or the cable cannot be disconnected.



2. Pull out the detector tray.



3. Take out the detector.
4. Push in the detector tray.

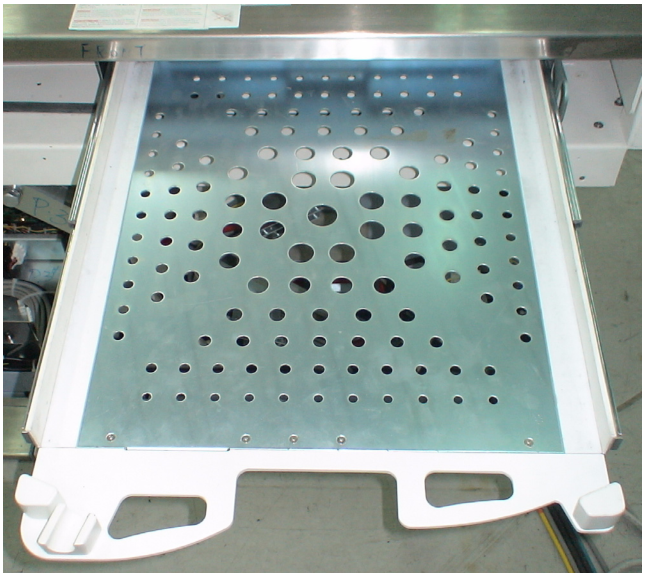
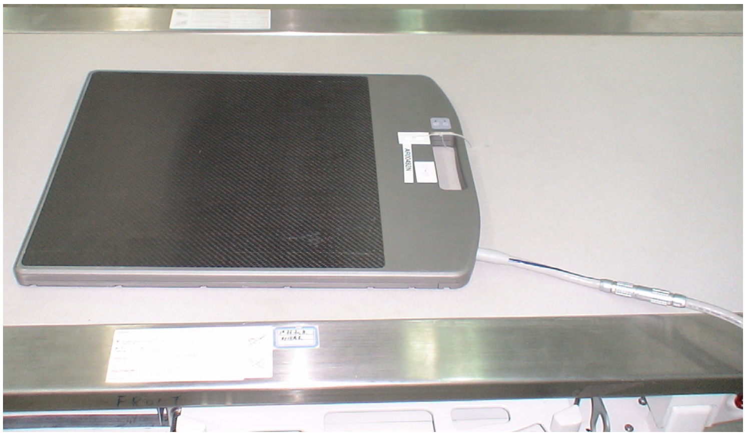
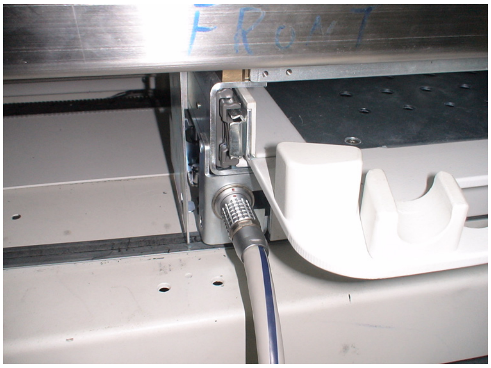


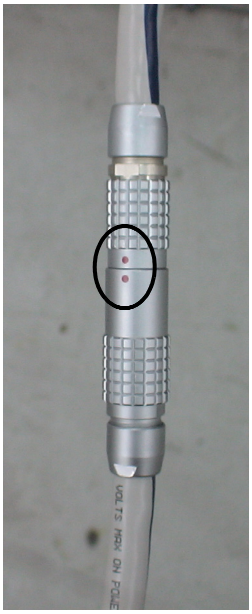
Table Top Detector Loading

Connect digital detector cable to table cable connector by extended cable.





NOTE: Connect the cable with the two red dots leveling.



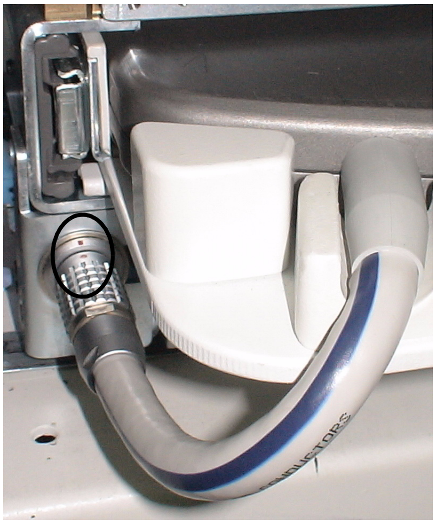
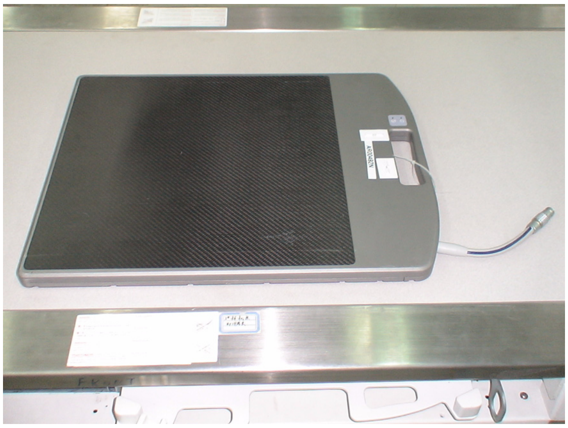
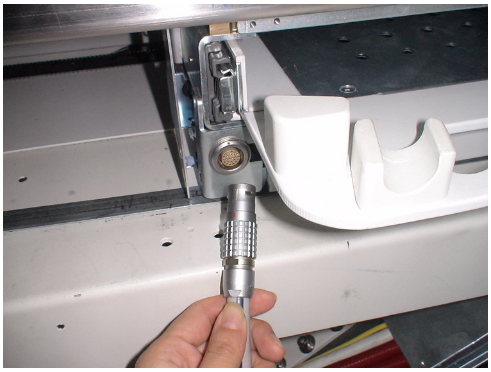


Table Top Detector Removal

Disconnect the extended cable connector in two ends.

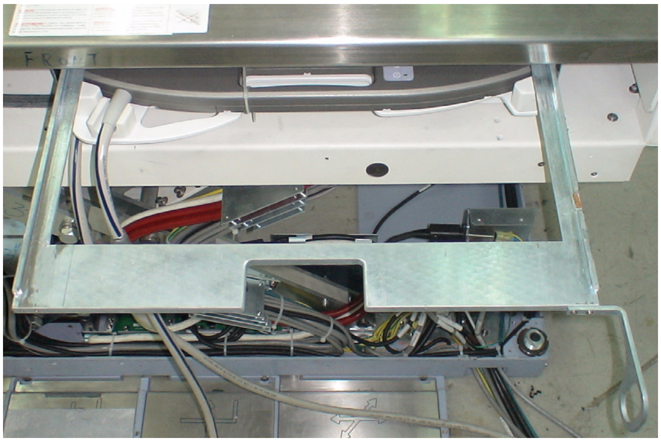




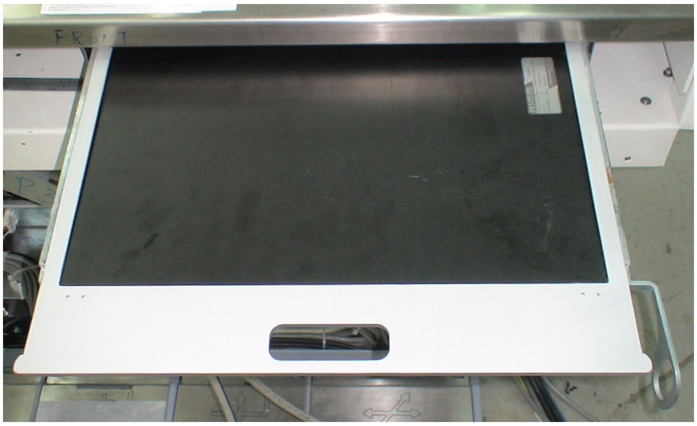
Grid Loading/Removal

Follow the procedure below for grid loading. For grid removal, follow the procedure below in reverse order.

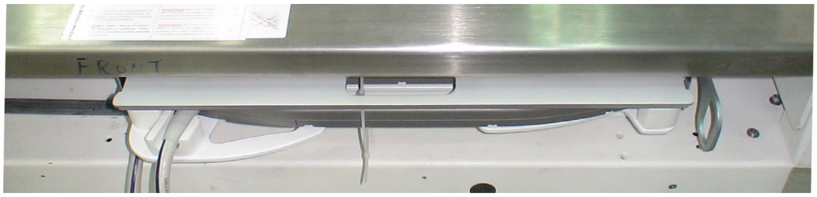
1. Pull out the grid tray.



2. Install the grid.



3. Push in the grid tray.



Radiographic Stretcher Table (Option)

The radiographic stretcher table (Figure 4-38) is used for a table application, for example, patients who cannot stand would lie on this table to take a chest AP examination.It is for radiographic examination only.

Figure 4-38 Radiographic stretcher table

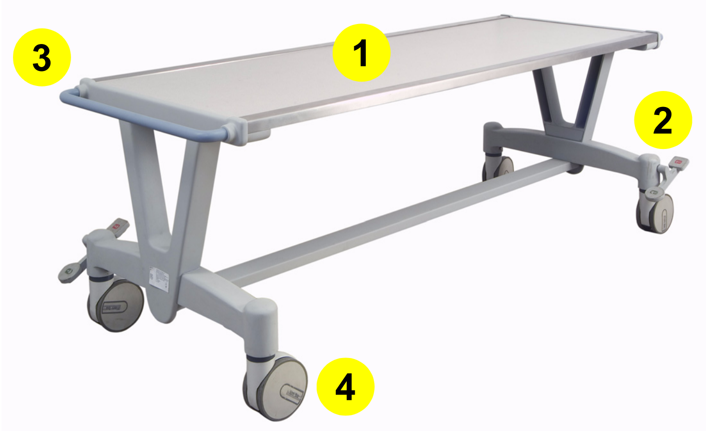


Table 4-10 Digital table components

Item	Description
1. Tabletop	The table dimensions are 2188mm in length, 720mm in width and 750mm in height. Its inherent filtration is less than 0.75mm of aluminum equivalent at 100 kVp. The tabletop can support a supine patient weighing up to 485 pounds (220 kg).
2. Table brakes	There are two foot pedals, step either of them can lock or release all the 4 wheels at the same time. There are two lock signs on each brake,the green one is the release side and the red one is the lock side.
3. Table Handle	Two handles at each of the narrower side of the table.
4. Table wheel	Each wheel can move in any direction.

How to Use the Table

To pull the table above the 90 degree detector when prepare for a table application.

Step the foot pedal with a green lock sign to release the table.

Use the handles and the grooves at the bottom of both the table top long rails when pushing or pulling the table.

Step the foot pedal with a red lock sign to lock the table when it is at the desired position.

WARNING: The radiographic stretcher table is only used for radiographic examination. It is not for a transportation, it is also forbidden to piled up any stuff on the table.

WARNING: It is forbidden to use the radiographic stretcher table outside the examination room.

WARNING: Proper supporting and braking shall be taken if the child is required to stand on the stretcher table for any examination.

WARNING: Please do check the detector is at the table detent position before moving the table above the detector for a table application, or the table might hit the detector seriously!

WARNING: The maximum load of the table is 220Kg, don't overload the table or it would damage the table.

WARNING: Watch out any possible injuries caused by bumping into other objects or patient falloff during table moving operation。

WARNING: Before moving the radiographic stretcher table, make sure any moving parts, accessaries or other moving objects are properly secured or fastened. Otherwise, Injury to person or damage to equipment may occur.

CAUTION: Make sure to secure the radiographic stretcher table properly to a structure to meet seismic requirements

CAUTION: Strongly recommend to lock the table when it is not in use.

System Cabinet

The system cabinet (Figure 4-39) houses the electronics for the Definium 6000. GE Service personnel can open the front of the cabinet to access the electronics.

The cabinet is 130.17 cm (51.25 in.) high - not including the back flange, 90.80 cm (35.75 in.) wide, and 71.75 cm (28.25 in.) deep.

Figure 4-39 System cabinet

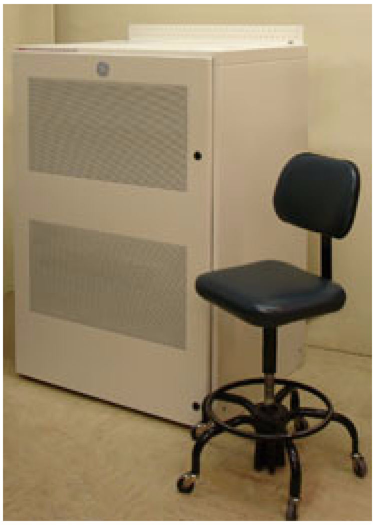
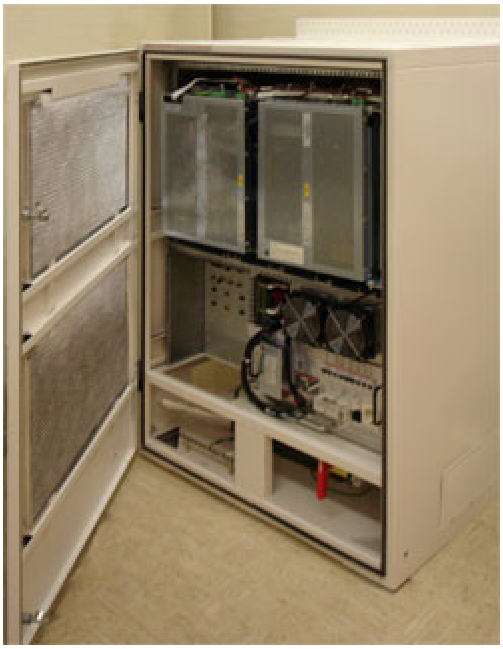


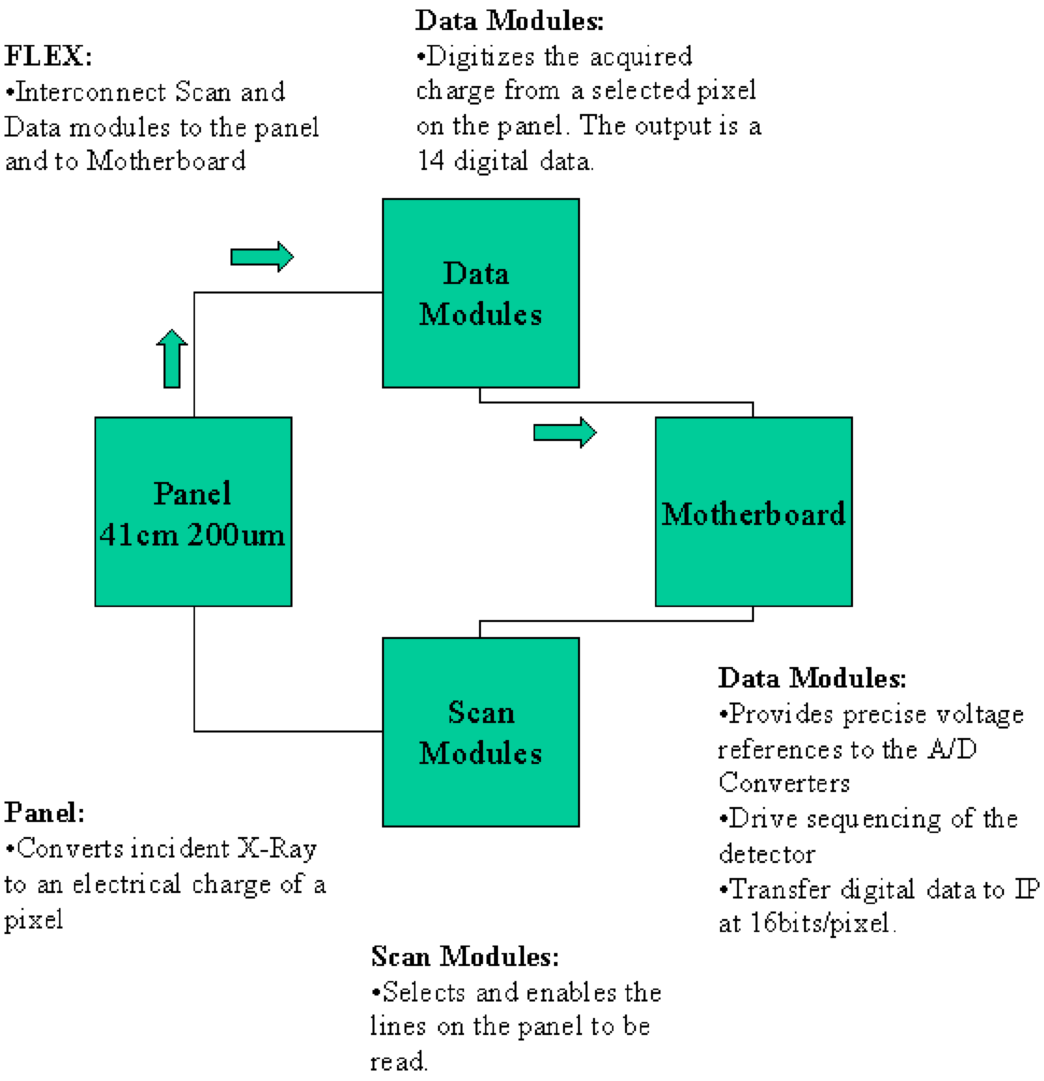
Figure 4-40 System cabinet with front open



Detector Overview

The detector is an x-ray imaging device. It consists of an array of 2048 by 2048 pixels. Each pixel is attached to a data acquisition circuit that converts incoming x-ray signal to 16-bit digital data.

Figure 4-1 Detector operation diagram



FLEX:
- Interconnect Scan and Data modules to the panel and to Motherboard

Data Modules:
- Digitizes the acquired charge from a selected pixel on the panel. The output is a 14 digital data.

Data Modules:
- Provides precise voltage references to the A/D Converters
- Drive sequencing of the detector
- Transfer digital data to IP at 16bits/pixel.

Panel:
- Converts incident X-Ray to an electrical charge of a pixel

Scan Modules:
- Selects and enables the lines on the panel to be read.

Panel

The panel consists of a thin-film amorphous silicon integrated circuit on a glass substrate with a scintillator coating. The scintillating material absorbs a percentage of the x-rays incident on it and converts the energy to light. The light from the scintillator is absorbed by the array of light sensitive amorphous silicon elements thereby partially discharging the capacitance of the photo-sensors. The amount of discharge is proportional to the amount of light observed.

Readout Electronics

The primary function of the readout electronics is the conversion of the charge-stored image in the flat panel photo diode array to a numerical data array, followed by the transmission of the data array to a digital image processor.

Physical Appearance / Finish

The detector unit is designed to be installable as 1) an external patient access/contact surface and 2) a non-external patient access/contact surface.

Detector surfaces have been treated with a Teflon finish for a smooth and easily cleanable surface. Care shall be taken to protect the surface from scratches.

Nameplates and Markings

A rating plate label will be attached inside the detector. The label will contain the detector control number, date/place of manufacture, maximum voltage and current rating.

Information on the Nameplate is to be used when communicating with GE personnel in reference to a detector.

Detector Safety Labels

The back of the GE DR Detector displays the following caution and warning statements:

⚠

CAUTION: **Device Weighs 13 lbs.**

⚠

CAUTION: **Do Not Drop.**

⚠

WARNING: **350 lbs. (160 kg) Max. Load.**

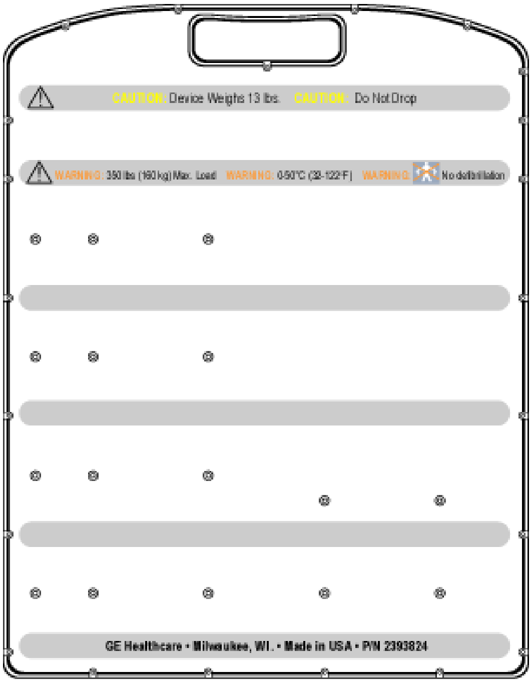
⚠

WARNING: **In-Use Temperature 0-50°C (32-122°F)**

WARNING: **To guarantee the best image quality, please make sure the environment temperature is between 20-30°C.**

WARNING: **No defibrillation**

Figure 4-2 Labels on back of detector


CAUTION: Device Weighs 13 lbs.
CAUTION: Do Not Drop
WARNING: 350 lbs (160 kg) Max. Load
WARNING: 0-50°C (32-122°F)
WARNING: No defibrillation
GE Healthcare • Milwaukee, WI. • Made in USA • P/N 2393824

Indicator LEDs

Two LEDs have been provided for indication of the detector status.

- The red LED lights up when the detector patient contact temperature exceeds 41°C.
- The green LED lights up when the detector is powered, and has performed at least 4 scrubs. This LED indicates "Ready to Image" status.
- The green LED flash when the detector is in idle mode.

Table 4-11 .L LED Conditions

Condition	Green LED		Red LED		Indication
Detector Off	Off	Off	Off	Off	Detector Off or No Power
Lamp Test	ON	6s	ON	6s	Power On Lamp Test

Condition	Green LED		Red LED		Indication
No Communicaton	50%	1s	50%	1s	Lost or no communication; Blink out of phase
Idle Mode	50%	1s	Off	Off	Idle Mode
Full Pw +4 Scrubs	ON	-	Off	-	Ready to Image
T>Twarning	-	-	50%	1s	Contact Temp exceed warning
T>Tsafety	-	-	100%	-	Contact Temp exceed safe level
BIST Fail	Off	Off	50%	2s	Failure in BIST
Power Timeout	Off	Off	50%	5s	No power mode command in time
BIST in Progress	75%	1s	Off	Off	Test Running
Image Transfer	50%	1s	Off	Off	Active data x fer

Environmental Constraints

Table 4-12 describes the environmental conditions that the detector is designed to withstand.

CAUTION: **Operation or storage outside of these constraints may cause damage to the detector.**

Table 4-12 Environmental Constraints

Item	**Operating Environment Constraints**	**Non Operating Environment Constraints**
	This column contains additional operating environmental constraints, within which the subsystem function and performance capabilities shall be in compliance.	This column defines additional Non-operating environmental constraints, within which the subsystem function and performance capabilities shall be in compliance, when returned to the operational state, within operating environment conditions.

Item	Operating Environment Constraints	Non Operating Environment Constraints
Ambient Temperature, humidity, Pressure	External ambient temperature range: +10 °C to +30 °C. rate of temperature change: 10 °C per hour ambient humidity range: 10% to 80%, non condensing. rate of humidity change: 30% per hour. atmospheric pressure (altitude) range: -400 meters to +3000 meters relative to sea level.	External ambient temperature range: +10°C to +45 °C. rate of temperature change: 20 °C per hour ambient humidity range: 5% to 95%, non condensing. rate of humidity change: 30% per hour. atmospheric pressure (altitude) range: -100 meters to +15,000 meters relative to sea level (to support pressurized transport)
Mechanical Stress & Vibration Forces	The detector assembly shall not be exposed to operating vibration spectrum exceeding the following parameters: Type: Random Frequency Range: 20 to 350 Hz Magnitude: 0.006g2 /Hz at 10-350 Hz Duration: 8 hours/axis (x, y, z)	The detector assembly shall not be exposed to non-operating vibration spectrum exceeding the following parameters: Type: Random Frequency Range: 10 to 2000 Hz Magnitude: 6 m/s2 RMS or 0.02g2 /Hz at 10-2000 Hz Duration: 15 minutes/axis (x, y, z)
Shipping & Storage Environment	Not applicable.	The non-operating shipping conditions shall be -20 to +60 with the detector and packing. The shipping container shall protect the detector from vibration of 2 Grms for 8 hours in the x, y, and z axes, random vibration from 10 to 2000 Hz such that the image quality is not degraded. Cargo hold during shipment shall be within the atmospheric pressure range of 700-1100hPa

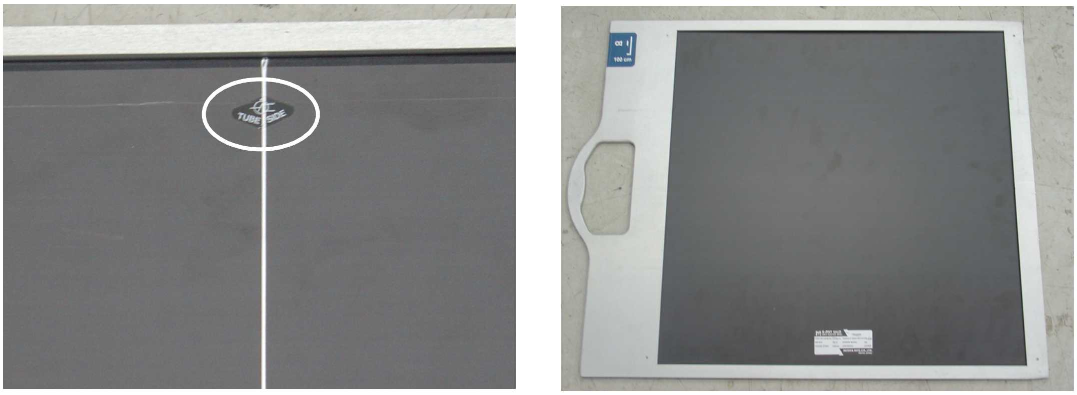
Grids (Option)

The Definium 6000 comes with five grids for optional purchase: 180cm (blue label, Wall Stand mode), 130cm (blue label, Wall Stand mode), 100cm (cyan label, Wall Stand and Table mode). The Grid labels show the receptor and SID. lists the focal distance, ratio, line pairs, and orientation of each grid.

Table 4-13 Grids

Grid	Nominal Focal Distance	Ratio		
1. Wall Stand	100 cm (40 in.)	13:1	70 lines/cm	Veritical
2. Wall Stand - Midrange (This grid is optional)	130 cm (52 in.)	10:1	70 lines/cm	Veritcal
3. Wall Stand	180 cm (72 in.)	13:1	70 lines/cm	Veritical
4. Wall Stand	100 cm (40 in.)	13:1	70 lines/cm	Veritical

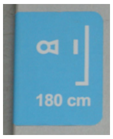
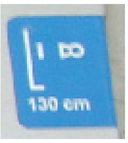
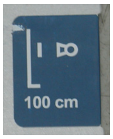
Figure 4-3 Grids

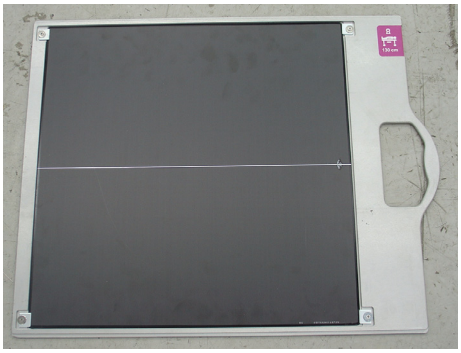
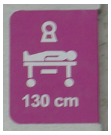
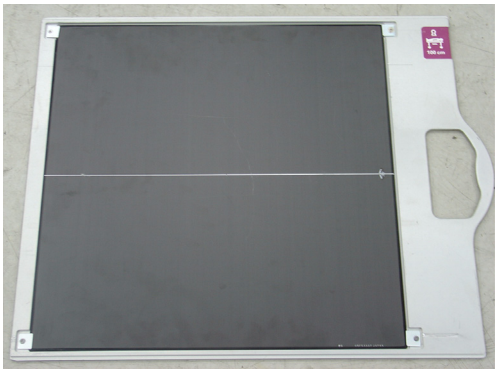
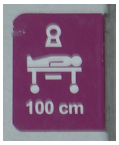


There is a transparent "Tube side" label on the front side of the grid.

Back side of the grid, no centeral line.

Table 4-14 Grid specification

Grid	Application	Label
	180 cm wall stand grid For wall stand 0 degree application Cover range: 145-245 cm	
	130 cm wall stand grid For wall stand 0 degree application Cover range: 90-190 cm	
	100 cm wall stand grid For wall stand 0 degree application Cover range: 90-115 cm	

Grid	Application	Label
	130 cm table grid For Table mode + angulation application Cover range: 90-190 cm	
	100 cm Radiographic Stretcher Table grid For Radiographic Stretcher Table mode + angulation application Cover range: 90-115 cm	

WARNING: **Be sure the grid is properly placed tube side up or Grid artifacts will negate a valid image. Additionally, the system should not allow bad placement of grid by operator.**

WARNING: **Be sure to insert the grid entirely into the groove at the lateral side of the wallstad before an aqusition or the IQ would be degraded. Please double check the LED grid display on the top of the wallstand column before an aqusition, when it is displaying a number(100cm e.g.), it means the grid has been entirely inserted, when the number is ---, it means there is no grid or the grid is partialy inserted.**

WARNING: **The gird must be changed to 100cm(stretcher table mode)or 130cm (stretcher table mode) (Figure 4-18) when the tube is at the standard table application position and would do a tube angulation application at the same time. If the grid is not one of these two, the IQ would be seriously impacted!, and the exposure hold would lit up.**

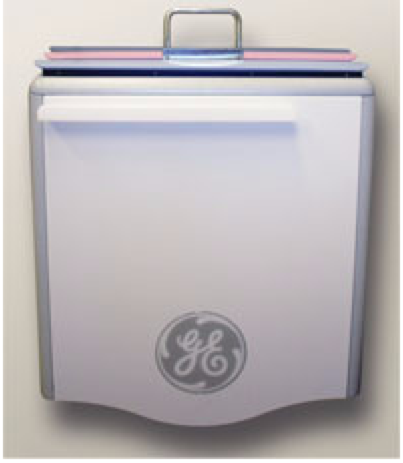
IMPORTANT!: If no angulation application when the tube is at the standard table application position (Figure 4-18), all the 100cm wallstand and table mode grid, 130cm wallstand and table mode grids are applicable.

WARNING: **Be careful the wallstand might hit the feet when it goes down to the lowest position.**

Grid and Accessories Holder

A holder to store grids and IQST QAP phantoms is available for optional purchase. It is recommended that grids and phantoms be stored in the holder when not in use. The holder is mounted on the wall stand and can store up to 4 grids and phantoms.

Figure 4-4 Holder with grids and IQST phantom



System Interlocks

Your system has a series of interlocks that can place the system in an exposure hold state. When certain conditions exist outside of normal operation, the red LED on the user interface becomes lit.

Grid Interlock

If the Grid interlock is activated, the red LED illuminates, indicating the grid is not properly centered and the SID is out of range.

Automatic Exposure Control (AEC) Interlock

When the red LED illuminates while using AEC, this indicates the tube is not centered laterally and longitudinally on the ion chamber that has been selected.

Tube Position Interlock

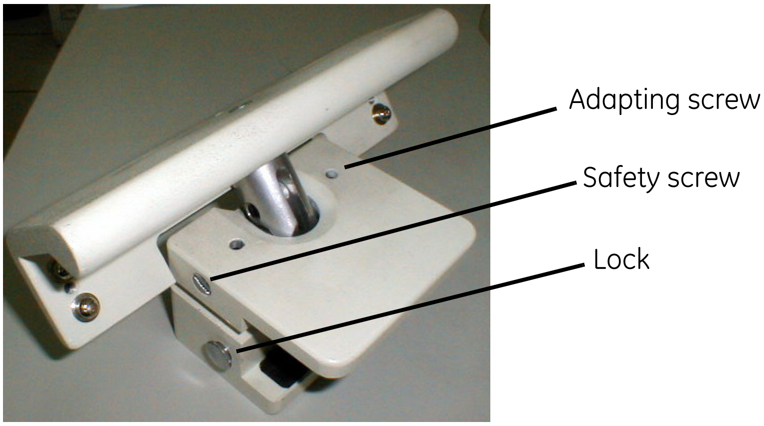
The Tube Position interlock is activated (red LED) when the X-ray field is outside of the detector area and is not centered.

Accessories (Option)

WARNING: **For continued safe use of this equipment, use only manufacturer recommended accessories.**

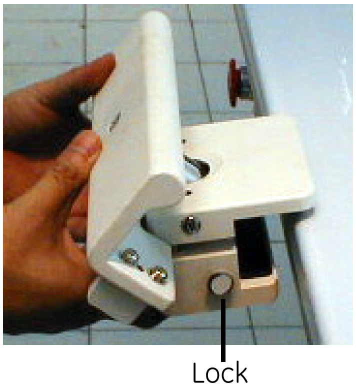
WARNING: **Accessories should be properly attached to the table and positioned so as not to interfere with system motions.**

Abdomen Compression Band



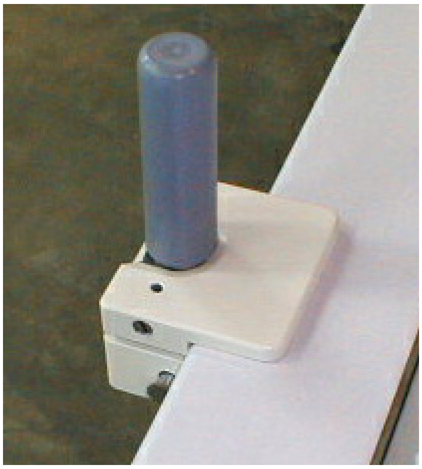
Installation:

1. Depress the lock, then release clamp.
2. Position the clamp, then depress the handle.
3. Fasten the compression band.

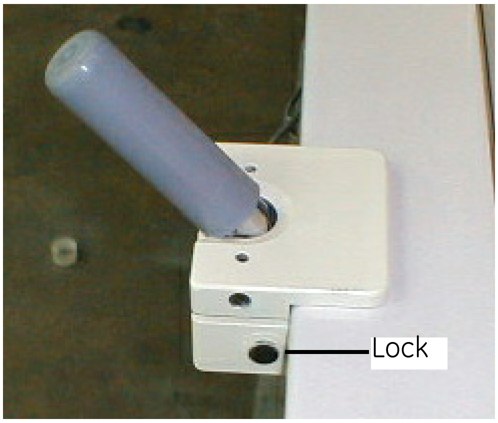


Patient Hand Grips

The patient hand grip installation is as same as compression band clamp.



Lock the Hand Grip

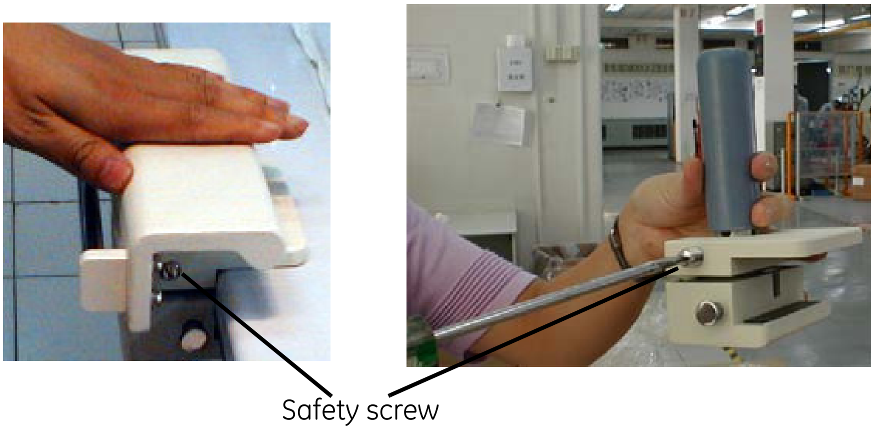


Release the Hand Grip

Adjusting

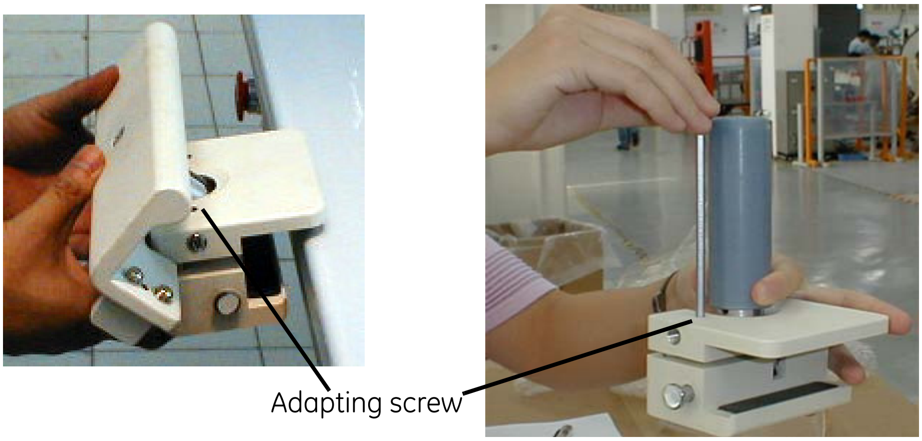
1. Depress the lock, then release clamp or grip.
2. Position the clamp or grip, then depress the handle.

3. Release two safety screws.


Safety screw

4. Use M2.5 Alien key adjust two adapting screws until clamp is firmly attached to table top.

5. Fasten safety screws.


Adapting screw

Chapter 5

General Information

This chapter explains the startup and shutdown procedures for your system. It also explains the tube warm up procedure which is important to maximize the life of your tube.

Topics covered include:

- *System Start up and Shut Down*
  - *Start up*
  - *Shutdown*
- *System Login and Log Off*
  - *Standard Login*
  - *Invalid Password Message*
  - *Emergency Login*
  - *Inactivity Timeout*
  - *Log Off*
- *System Reset*
- *Tube Warm Up*
- *Lead Markers*
- *System Status and Messages*
  - *Expose Hold*
  - *X-ray Tube Heat Units Remaining*
  - *System Status Area*
  - *Message Log*
  - *Audio Indicators*
- *ILinq*

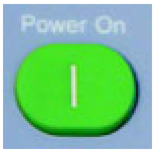
System Start up and Shut Down

The system should remain on at all times for optimal performance.

Start up

1. Press the Power On button on the RCIM(II).

Figure 5-1 Power button on RCIM(II)

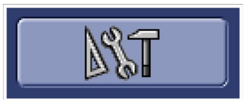


2. Wait 3 minutes to get power on the whole system.
   - The system powers up automatically.
   - If enabled, the Login screen appears on the monitor when the system is ready.
   - If Login is not enabled, the Worklist appears on the monitor when the system is ready.

Shutdown

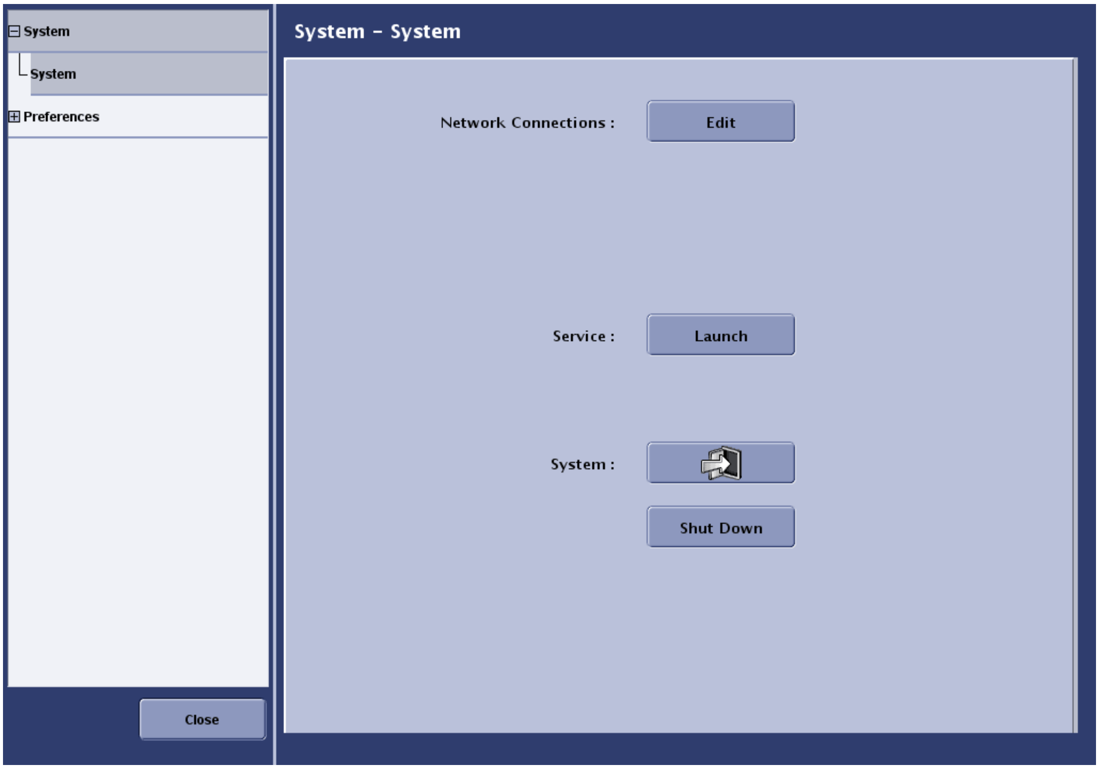
1. Close all current exams.
2. Click the [UTILITY] button at the top of the Worklist screen.

Figure 5-2 Utility button



3. Select System on the Utilities screen.

Figure 5-3 Utilities – System screen


System
System
Preferences
Close
System – System
Network Connections :
Edit
Service :
Launch
System :
Shut Down

4. Click [SHUTDOWN].
    - A message appears: “The system will be shut down.”
5. Click [YES] to proceed with shut down.
    - The system powers off and the monitors go blank.
    - [CANCEL] stops the system from shutting down and returns you to the Utilities screen.

System Login and Log Off

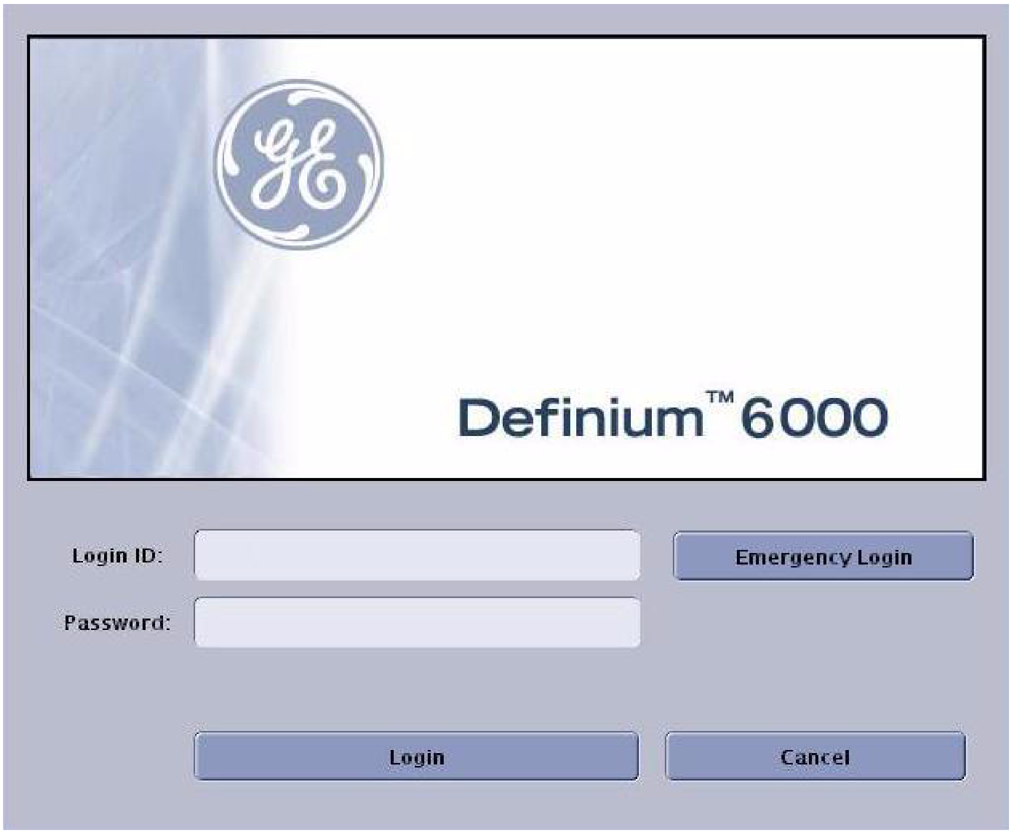
This following sections apply if the system is configured for Login ability in the Service User Interface.

Refer to Appendix A: Login Administration for information on administering the login function.

Standard Login

The Login screen (Figure 5-4) appears when the system is started, reset, or after a user logs off. The system may also be configured to display the login screen if the system has been inactive for a specified period of time (inactivity timeout).

Figure 5-4 Login screen


Definium™ 6000
Login ID:
Password:
Emergency Login
Login
Cancel

1. Start up the system or log off the previous user.
   - The Login screen appears.
2. Type in your Login Name, if necessary.
3. Type in your Password.
4. Click [LOGIN].
   - The Worklist appears.

NOTE: If you have administrator access, a message appears: "You have both regular user and admin user privileges. To access the admin screen, select the check box before continuing with the login, otherwise just continue with the login."

- To login and begin working with the unit, press [LOGIN] and the Worklist appears.
- To login and access login administrator functions, select the Enter admin screen checkbox and then press [LOGIN]. The login Administration screen appears. Refer to Appendix A: *Login Administration* for more information.

Invalid Password Message

Your Password must be entered correctly for you to log in. If the password you entered is not the correct password for the selected Username, an error message will appear in the top portion of the Login screen: "An unknown error has occured. Please try again or contact your System Administrator for more details."

If you see the error message, do the following:

1. Make sure that the correct **Login Name** is displayed in the field. Depending on the configuration, the login name may be case sensitive. That is, "aBc" is not the same login name as "ABc".

1. Retype your **Password** carefully. Your password is case sensitive; that is, "xYz" is not the same password as "Xyz".

2. Click [LOGIN].
   - Contact your technical support group if you still are not able to login.

Emergency Login

Emergency Login is a HIPAA required function to allow quick access to medical systems in the event of an emergency. Depending on the system's configuration, this option may not be available. Refer to Appendix A: *Login Administration* to configure the Emergency login functino.

Emergency Login will allow exposures, but does not allow connection to HIS/RIS or PACS hosts.

CAUTION: **The Emergency Login function should NOT be used when there is time to login normally, when there is time to receive assistance from technical support, or if there is no emergency situation. Your facility may track the use of this function.**

1. Press [EMERGENCY LOGIN].
   - Depending on the system's configuration, you may be prompted to enter your name. Enter your name and click [LOGIN].

2. The Worklist screen appears.

Inactivity Timeout

Depending on the system's configuration, the system may show the Login screen after a specified period of inactivity. The Login screen acts as a screen saver, covering displayed information to protect patient privacy.

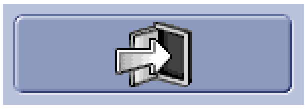
The administrator configures if the system will timeout and how long the system must be inactive before the Login screen appears. Refer to Appendix A: *Login Administration* to configure the inactivity timeout function.

To access the system screens, follow the *Standard Login* or *Emergency Login* process described above.

Log Off

1. Close, suspend, or discontinue any open exams, if necessary.
2. Close the Image Viewer, if necessary.
3. Click [LOGOFF] at the top of the Worklist screen.
    - Or open the Utility screen, go to System and click [LOGOFF] (Figure 5-5).

Figure 5-5 Utilities screen logoff button



    - A message appears: "Do you really want to log off?"
4. Click [OK].
    - The Login screen appears.
    - [CANCEL] closes the screen and returns you to the last screen.

System Reset

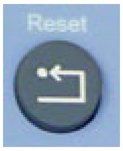
A controlled system reset should be performed once a week before routine QAP. Refer to for Chapter 13: *Quality Assurance Process* more information.

System reset is used as a last resort if the workstation software stops working. A system reset may take 4 minutes to complete.

NOTE: The system will not be available for acquiring images during the reset cycle.

1. If possible, close, suspend, or discontinue any open exams.
2. If possible, log off the system.
3. Press and hold the RESET button on the RCIM(II) until you hear the beep .

Figure 5-6 Reset button on RCIM(II)



4. Release the button and wait until the Login or Worklist screen appears.
    - As the system resets, various screens will appear on the monitors. This is normal.
    - The system will auto-start and the Login screen or Worklist screen will appear when the system is ready.

Tube Warm Up

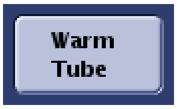
Tube warm up is a procedure that brings the X-ray tube up to a normal operating temperature. The tube has to be brought to this temperature slowly. Tube warm up should be done if no exposures have been made within two hours. This makes the life on the tube last longer.

⚠

CAUTION: **Initiating an exposure when the X-ray tube is cold may damage the tube target.**

Click [WARM TUBE] (Figure 5-7) at any time to see the tube heat status.

Figure 5-7 Warm tube button



When the system need tube warmup, a reminder will appear, please click (WARM TUBE).

Figure 5-8 Tube warmup reminder

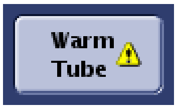
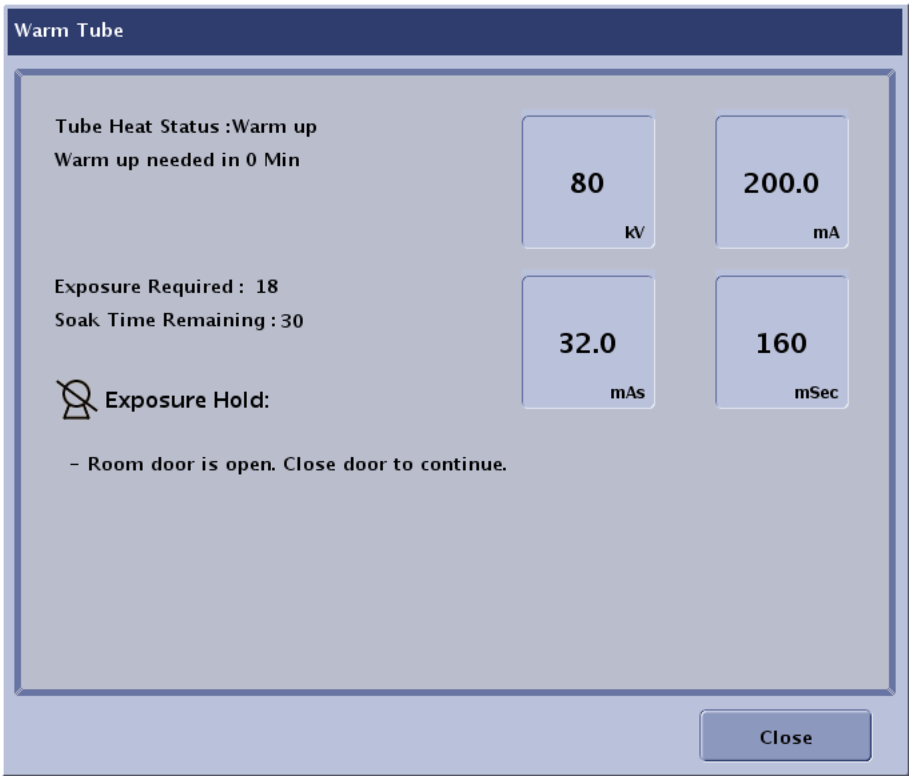


Figure 5-9 Warm Tube screen



Warm Tube

Tube Heat Status :Warm up
Warm up needed in 0 Min

80 kV
200.0 mA

Exposure Required : 18
Soak Time Remaining : 30

32.0 mAs
160 mSec

Exposure Hold:

- Room door is open. Close door to continue.

Table 5-15 Warm Tube functions

Function	Description
Tube Heat Status	Shows the current status of the tube.
Warm up needed in _ Min	Shows how many minutes until the tube needs to be warmed. A time of 0 minutes means that the tube must be warmed immediately.
Exposure Required	Shows the number of exposures required to warm the tube.
Soak Time Remaining	Shows how many seconds of soak time remain.
Exposure Hold	Lists any inhibits to making an exposure or warming the tube.
kV	Shows the kV of the current exposure.
mA	Shows the mA of the current exposure.
mAs	Shows the mAs of the current exposure.

Function	Description
mSec	Shows the mSec of the current exposure.
[CLOSE]	Closes the Warm Tube screen.

Follow this process to warm up the tube.

WARNING: **X-rays are generated during tube warm up. Use proper radiation practices at all times.**

1. Check the room to make sure it is clear of other personnel before making X-ray exposures.
2. Click [WARM TUBE] on the Worklist or Acquisition screen.
3. Correct any exposure holds.
4. Press the Hand-switch Prep/Expose button to the Expose position and hold until the **Exposures Required** reads “0”.

NOTE: The exposure hand switch should be held for 18 exposures to ensure proper tube warm up.

5. Wait until the **Soak Time** reads “0”.
6. Click [CLOSE] to finish tube warm up.

Lead Markers

As in any General Radiography procedure, lead marker placement is important to ensure markers are properly recorded on the image. Place the lead marker in an area of patient attenuation. If lead markers are placed in regions of direct radiation (saturation), there is a high risk they will be processed out of the image during image processing. Saturated areas beyond the anatomy are no longer part of the final image. This is most likely to happen on high technique exposures.

CAUTION: **Exercise care when placing lead markers to guarantee their presence in the final image. Every attempt must be made to assure markers are not located in regions of direct radiation, but are located in regions where some patient attenuation of radiation is present without obstructing the anatomical information of interest.**

System Status and Messages

Several types of messages and indicators are displayed on the Acquisition Workstation screens to inform you of the system and subsystem operational status as well as error messages. The complete list of error messages is available in the Service Manual.

Expose Hold

The Expose Hold button (Figure 5-10) appears at the bottom of the Worklist or Acquisition screens when there is some condition that prevents an x-ray from being taken, such as the exam room door being open or the tube is not in alignment with the detector.

The Expose Hold light on the RCIM(II) and WS display board will also light up when there are inhibits to exposures.

Click the Expose Hold button to view a list of all errors and interlocks that are preventing the exposure (Figure 5-11). The items are removed from the list as they are corrected. The Expose Hold button disappears when all errors and interlocks are corrected.

Figure 5-10 Worklist and Acquisition screen Expose Hold button

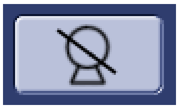
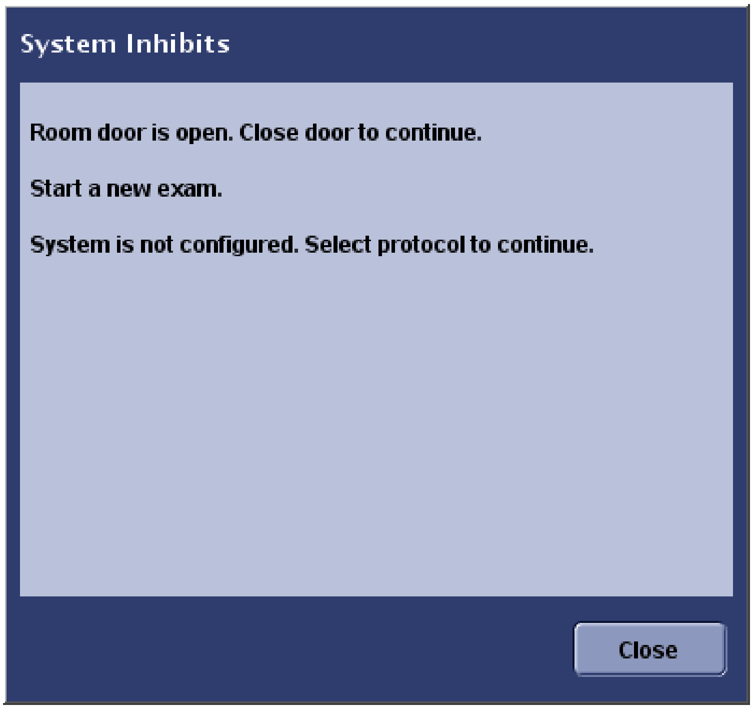


Figure 5-11 System Inhibits list



System Inhibits

Room door is open. Close door to continue.

Start a new exam.

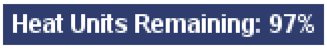
System is not configured. Select protocol to continue.

X-ray Tube Heat Units Remaining

The Heat Units Remaining area (Figure 5-12)on the bottom of the Worklist and Acquisition screens shows the available capacity for the tube to absorb heat before it must be allowed to cool. A high percentage indicates that the tube is relatively cool and is able to take multiple exposures.

If the tube becomes too warm (20% heat units or less), exposures will be inhibited until the tube cools to a functional level.

Figure 5-12 Heat Units Remaining status



Heat Units Remaining: 97%

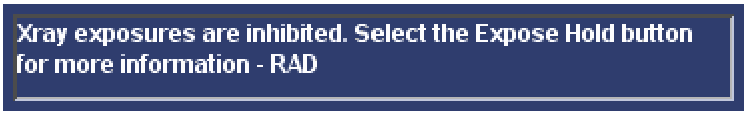
System Status Area

System status messages are displayed on the bottom of all main Workstation screens (Figure 5-13). System Status messages are displayed when the system detects an irregularity in system operation. The message informs you when remedial action is required to correct the situation.

A console beep announces the arrival of an informational message. There are situations where a system condition is detected that does not require stopping the procedure. The message tells you to Continue or to Continue/Call Service (continue and call service).

NOTE: To clear the system status area, open the Message Log (described below) and close it again.

Figure 5-13 System Status message



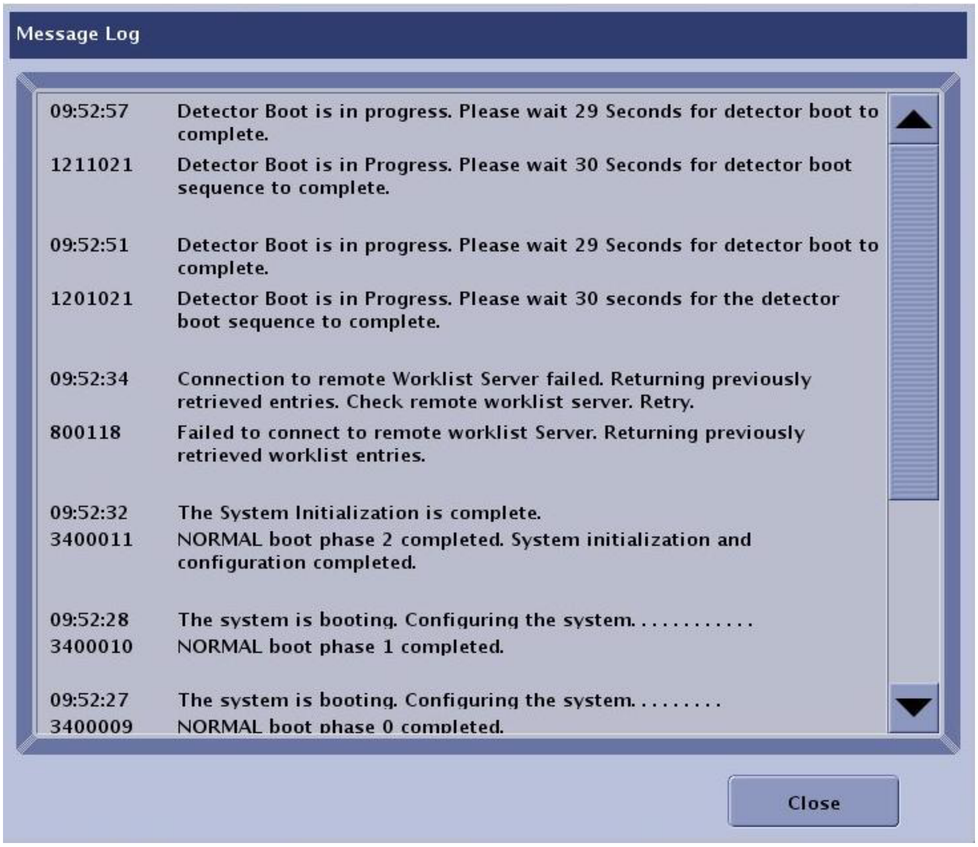
Xray exposures are inhibited. Select the Expose Hold button for more information - RAD

Message Log

Clicking the Message Log button at the bottom of any screen opens the Message Log (Figure 5-14). The Message Log shows all status messages since the last system restart. The messages are listed in descending chronological order, that is, the latest message is listed first. This screen allows operators and service personnel to display, review, and analyze system status messages.

If the message number is more than the messages in the list, [PREVIOUS] and [NEXT] will be activated, and you can view all the useful messages.

Figure 5-14 Message Log

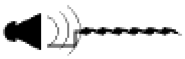


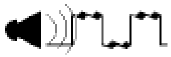
```
09:52:57    Detector Boot is in progress. Please wait 29 Seconds for detector boot to
            complete.
1211021     Detector Boot is in Progress. Please wait 30 Seconds for detector boot
            sequence to complete.

09:52:51    Detector Boot is in progress. Please wait 29 Seconds for detector boot to
            complete.
1201021     Detector Boot is in Progress. Please wait 30 seconds for the detector
            boot sequence to complete.

09:52:34    Connection to remote Worklist Server failed. Returning previously
            retrieved entries. Check remote worklist server. Retry.
800118      Failed to connect to remote worklist Server. Returning previously
            retrieved worklist entries.

09:52:32    The System Initialization is complete.
3400011     NORMAL boot phase 2 completed. System initialization and
            configuration completed.

09:52:28    The system is booting. Configuring the system. . . . . . . . . . .
3400010     NORMAL boot phase 1 completed.

09:52:27    The system is booting. Configuring the system. . . . . . . .
3400009     NORMAL boot phase 0 completed.
```

Audio Indicators

There are several audio system indicators you can expect to encounter during operation. Table 5-16 provides a summary of the major audio indicators.

Table 5-16 Audio Indicators

Name/Visual Indicator	Audio Indicators	Cause	Comment
X-Ray On (RCIM(II) light)		Occurs during normal procedures in all X-ray exposure modes when there is a visual indicator but no audible tone.	Normal operation.

Name/Visual Indicator	Audio Indicators	Cause	Comment
Heat Wait		Results when the selected technique would exceed the total heat storage capacity of the tube target.	Further exposures are inhibited. The display automatically resets when the tube has enough heat units remaining to complete the selected technique. Heat Wait tone is an optional feature. This tone is only available if the system is configured to use it.

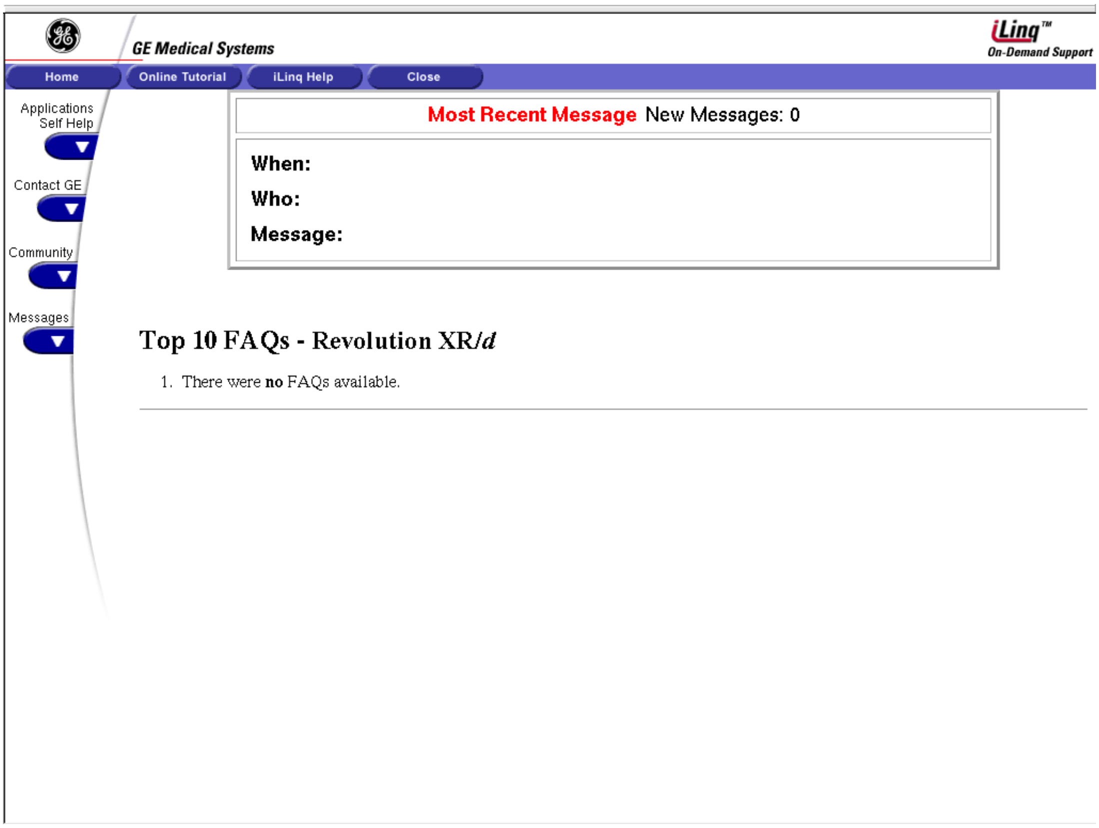
ILinq

ILinq is an optional feature of your system that allows access to remote service and clinical applications support.

The iLinq system lets authorized Service Engineers and Applications Specialists, located at GE Healthcare's Service Support Centers, access X-ray systems (with your permission) to provide the following services:

- Faster Emergency Service response
- Customer Applications training and assistance
- System troubleshooting and diagnostics
- Accumulate system information for failure analysis, resolution and prediction to assist in maintaining optimal X-ray system performance

Figure 5-15 iLinq main screen


GE Medical Systems
iLinq™
On-Demand Support
Home
Online Tutorial
iLinq Help
Close
Applications Self Help
Contact GE
Community
Messages

Most Recent Message New Messages: 0

When:

Who:

Message:

Top 10 FAQs - Revolution XR/*d*

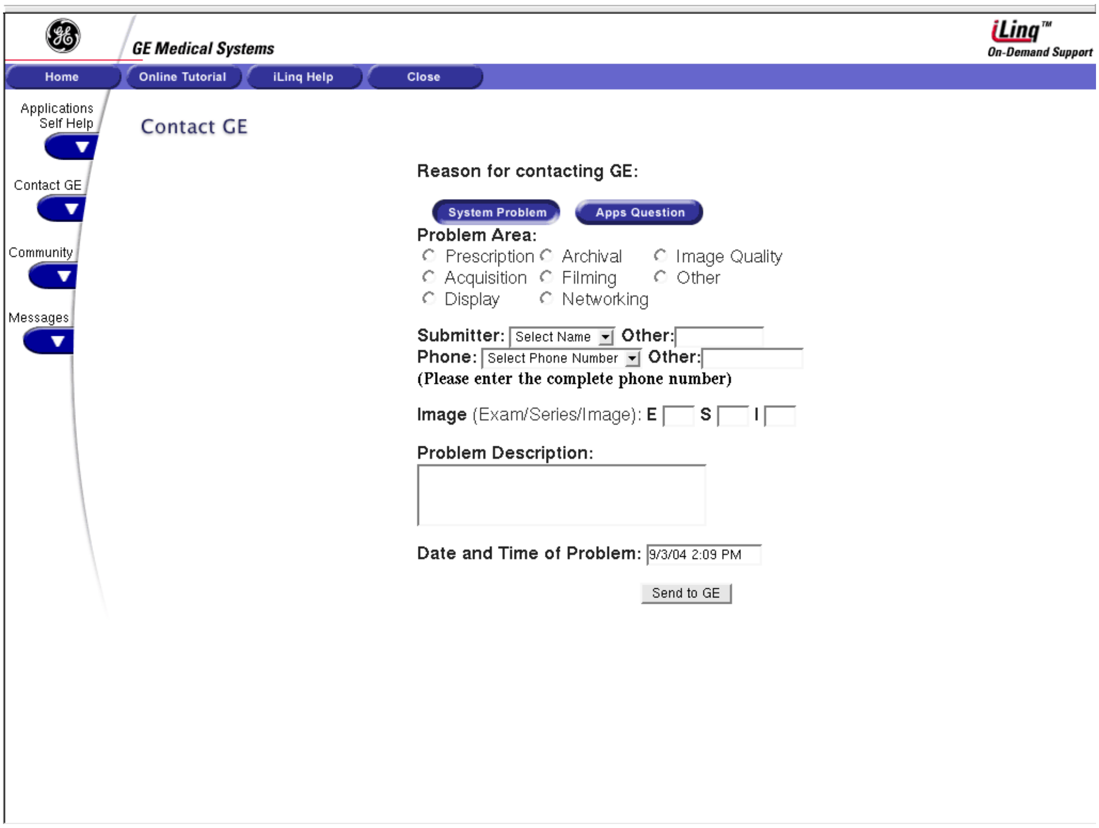
1. There were **no** FAQs available.

Table 5-17 iLinq Screen functions

Function	Description
Application Self Help	Provides applications protocol descriptions, newsletters, and a list of frequently asked questions as well as additional TiP (Training in Partnership) educational opportunities
Contact GE	Allows the electronic submission of a service request or applications question directly to the Online Center. Figure 5-16 shows the screen you use to report a problem with your system, using the iLinq system.
Community	Connects you to GE Healthcare's online community of experts.
Messages	Receives messages from the Online Center.
Online Tutorial	Access online training for iLinq features.

Function	Description
iLinq Help	Provides help for all of the iLinq features. In order to receive detailed help on a particular topic, simply make your selection from the items to the left side of the screen by clicking on them.
Close	Closes iLinq and returns you the Definium 6000 system.

Figure 5-16 iLinq Contact GE screen


GE Medical Systems
iLinq™
On-Demand Support
Home
Online Tutorial
iLinq Help
Close
Applications Self Help
Contact GE
Community
Messages
System Problem
Apps Question
Send to GE

Contact GE

Reason for contacting GE:

Problem Area:
○ Prescription ○ Archival ○ Image Quality
○ Acquisition ○ Filming ○ Other
○ Display ○ Networking

Submitter: Select Name Other:
Phone: Select Phone Number Other:
(Please enter the complete phone number)

Image (Exam/Series/Image): E S I

Problem Description:

Date and Time of Problem: 9/3/04 2:09 PM

Use this procedure to connect to the iLinq system when you need to report a problem with your system.

1. Click the [iLinq] icon on the Worklist or Acquisition screens.
2. Click [CONTACT GE].
3. Enter the required information into the Contact GE iLinq screen.
4. Click [SEND TO GE].
5. Click [CLOSE].
    - iLinq closes and returns you to the Worklist or Acquisition screens.

Installation and use of the iLinq system is limited to GE Customers with an X-ray system that is under warranty or covered by a valid GE Service Contract, in accordance with the terms and conditions of the iLinq Agreement or GE Service Contract. The presence of the GE iLinq system alone, at a your site, does not provide you any rights or title to the iLinq system or any license or right to access, use or decompile the iLinq system. Any access to or use of the iLinq system beyond the conditions specified in the iLinq Agreement or GE Service Contract; or any decompilation of the iLinq system by anyone other than GE personnel is prohibited. By signing the iLinq Agreement, you agree to use reasonable effort to protect the iLinq system against damage or loss and to prevent access to, use of or decompilation of the iLinq system by unauthorized personnel.

Chapter 6

Worklist

The Worklist is the starting point for patient set up and selecting procedures for acquisition. All exams begin from this screen.

The Worklist information and functions are based on DICOM standards.

This chapter explains the procedures for entering data into the system and setting up a patient.

Topics covered include:

- *Overview*
  - *Patient List Columns*
- *Manage List / Find Procedures*
  - *Messages*
  - *Search By*
  - *Sort by Column*
  - *Filter List*
  - *Refresh*
- *Select Procedures*
  - *Select a Single Procedure*
  - *Select Multiple Procedures*
- *Delete Procedures*
  - *Delete a Single Procedure*
  - *Delete Suspended Procedures*
- *Add Patient / Edit Patient Information*
  - *Overview*
  - *Add Patient*
  - *Edit Patient Information*

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Overview

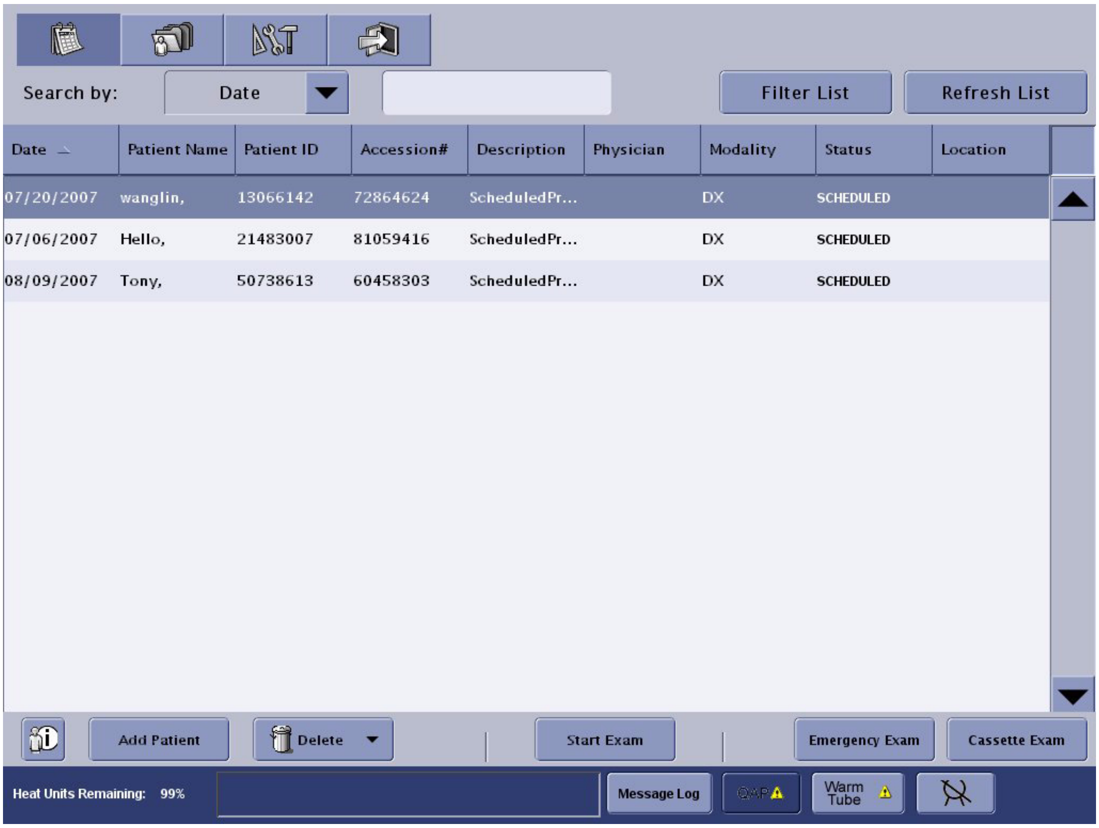
The Worklist (Figure 6-1) shows scheduled, completed, discontinued, suspended, and active procedures.

The majority of the Worklist is the Patient List. The Patient List is a large table made of standard columns and rows. Each row in the list is a procedure, or exam to be performed. A patient may have multiple procedures (rows) on the Worklist.

Procedures listed can be classified under two categories:

- Locally entered procedures: This category refers to procedures entered by the user on the workstation, either by manually entering the information or by using an bar code scanner. Locally entered procedures are only available to the workstation that they were entered on. They do not update automatically and no other workstation can access them.
- Hospital Information System (HIS) or Radiology Information System (RIS) Procedures: This category refers to procedures that the Worklist can automatically update from the central HIS/RIS database. Other workstations can be configured to access these procedures.

Figure 6-1 Worklist screen



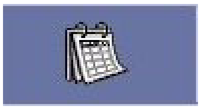
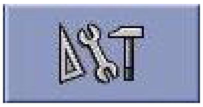
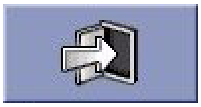
Search by: Date

Date	Patient Name	Patient ID	Accession#	Description	Physician	Modality	Status	Location
07/20/2007	wanglin,	13066142	72864624	ScheduledPr...		DX	SCHEDULED	
07/06/2007	Hello,	21483007	81059416	ScheduledPr...		DX	SCHEDULED	
08/09/2007	Tony,	50738613	60458303	ScheduledPr...		DX	SCHEDULED	

Heat Units Remaining: 99%

Table 6-1 lists and describes all the functions on the Worklist screen.

Table 6-1 Worklist Functions

Function	Description
Worklist 	Click this icon can show the whole worklist on the screen. All the patient detail information can be found. The information can be added from RIS/HIS or add the infromation from the system. The list can be displayed by different filters.
Image Management 	Click this icon to display all the image detail information: study date, Series information etc.
[UTILITIES] 	Opens a screen where system settings (such as Network and Printer connections) and preferences may be changed. If the Login function is enabled, the preferences you are allowed to change will vary depending on your level of access. Refer to *Chapter 15: Set Preferences* for more information.
[LOG OFF] 	If the Login function is enabled, clicking this button logs the current user off of the system. Refer to *Chapter 5: General Information-System Login and Log Off* for more information.
[PATIENT INFORMATION] 	Shows the Patient Information screen for the selected procedure. **NOTE:** Patient Information is editable if the currently selected procedure has not been opened. Once the exam starts the Patient Information is no longer editable. Patient Information is not editable if multiple procedures are selected. Refer to *Add Patient / Edit Patient Information* for more information.
[REFRESH LIST] Refresh List	Updates the worklist view with new information from the HIS or RIS, which shows changes to the procedure records. Also removes any filters that have been applied. Refer to *Refresh* for more information on automatically refreshing the Worklist.

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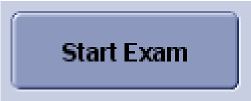
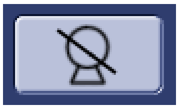
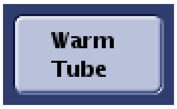
Function	Description
[FILTER LIST] Filter List	Displays a worklist query screen and filters the RIS or HIS records to find procedures that meet specific criteria. Refer to *Filter List* for information on how to filter the Worklist.
Procedure List Area	Shows all procedures scheduled for examinations during a working day. Procedures on the list may be downloaded from the RIS/HIS or may be created locally on the Acquisition workstation. The list may be sorted by column, searched, or filtered. The time period displayed is configurable. Refer to *Chapter 15: Set Preferences* for information on changing the time period displayed.
[ADD PATIENT] Add Patient	Allows you to enter patient information and adds the patient to the Patient List. Refer to *Add Patient / Edit Patient Information* for more information.
Search By Search by: Date	Searches for procedures by the selected the column name in the drop-down list and the search criteria entered into the text box. Refer to *Search By* for information on searching the list.
[DELETE] or [DELETE ALL] 	[DELETE] - Removes the selected procedure or procedures from the Patient List. [DELETE ALL] - Removes all completed and discontinued procedures from the Patient List. **NOTE:** [DELETE] or [DELETE ALL] does not remove procedures from the RIS or HIS. [DELETE] or [DELETE ALL] does not remove any exam images from the image database. Refer to *Delete Procedures* for more information.
[START EXAM] or [RESUME EXAM] 	Starts, continues, or appends the selected procedure. The button name changes depending on the Scheduled Status of the selected procedure. If the selected procedure has a Status of "Suspended", the button name changes to [RESUME EXAM].

Function	Description
[EMERGENCY EXAM] Emergency Exam	Begins an exam without selecting a procedure from the Patient List or adding the patient. The system will assign a unique tracking number as the Patient Name. **NOTE:** The tracking number is the date and time the exam was initiated. The time is recorded to the second.
[CASSETTE EXAM] Cassette Exam	Begins a cassette exam. Cassette exams allow exposures to be taken without any digital patient record or image storage.
[MESSAGE LOG] Message Log	Brings up the message log since the last system re-start. Refer to *Chapter 5: General Information-System Login and Log Off* for more information.
[QAP] 	Brings up the screens that allow you to perform QAP. Refer to *Chapter 12: Dual Energy Exposure* for more information.
[EXPOSE HOLD] 	Appears when there is some condition that prevents an x-ray from being taken, such as the exam room door being open or the tube is not in alignment with the detector. Click the button to view a list of all errors and interlocks that are preventing the exposure. The items are removed from the list as they are corrected. The button disappears when all errors and interlocks are corrected.
[WARM TUBE]  	Brings up the tube warming status. Refer to *Chapter 5: General Information-Tube Warm Up* for more information.
[iLinq] 	Connects to iLinq support services. Refer to *Chapter 5: General Information-ILinq* for more information.

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Function	Description
System Status The System Initialization is complete.	Displays the last system status message. To clear the system status area, open the Message Log and close it again. Refer to *Chapter 5: General Information-System Status and Messages* for more information.
Heat Units Remaining Heat Units Remaining: 97%	Shows the percentage of heat units remaining. Refer to *Chapter 5: General Information-System Status and Messages* for more information.

Patient List Columns

Table 6-2 describes the columns on the Worklist. This information comes from what has been entered in the Patient Information screen. Refer to *Add Patient / Edit Patient Information* for detailed descriptions of the information presented.

Table 6-2 Worklist columns

Column	Description
Date	The date the procedure is scheduled to occur. On locally added procedures, the current date is the default.
Patient Name	The full name of the patient as entered in Add Patient/Patient Information screen.
Patient ID	The patient's medical record number or any number that distinguishes the patient.
Accession #	The patient's accession number.
Description	Detail information for every procedure,anatomy name etc..
Physician	The name of the physician who perform the exam.
Modality	The modality of the procedure.

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Column	Description
Status	The status of the procedure. Available options are: • Scheduled – procedure has been created but not started. • Completed – procedure has been closed. • Suspended – procedure was started then interrupted. • Discontinued – procedure was opened but cannot be completed. • In progress– procedure is currently in progress. Refer to *Chapter 7: Image Acquisition-End Exam*for more information about Completed, Suspended, and Discontinued exams.
Location	

Re-size Columns

Columns in the patient list may be re-sized in order to reveal more information, such as seeing a patient's entire name.

1. Use the mouse to move the pointer to between two column headings.
   - The cursor changes from an arrow to a re-size indicator
2. Click and drag the re-size indicator left or right to increase or decrease the column width.
3. Release the mouse button when column is the correct width.
4. Repeat for any other columns you want to re-size.

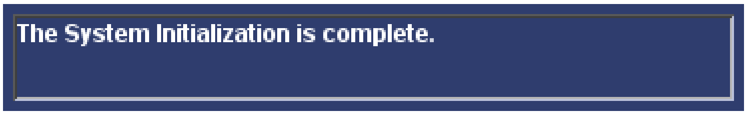
Messages

Current system status messages are displayed in the system status area. These messages inform you of the system's readiness to take exposures or any problems with the software.

The area displays the last message.

NOTE: To clear the system status area, open and close the Message Log.

Figure 6-2 System status area



The System Initialization is complete.

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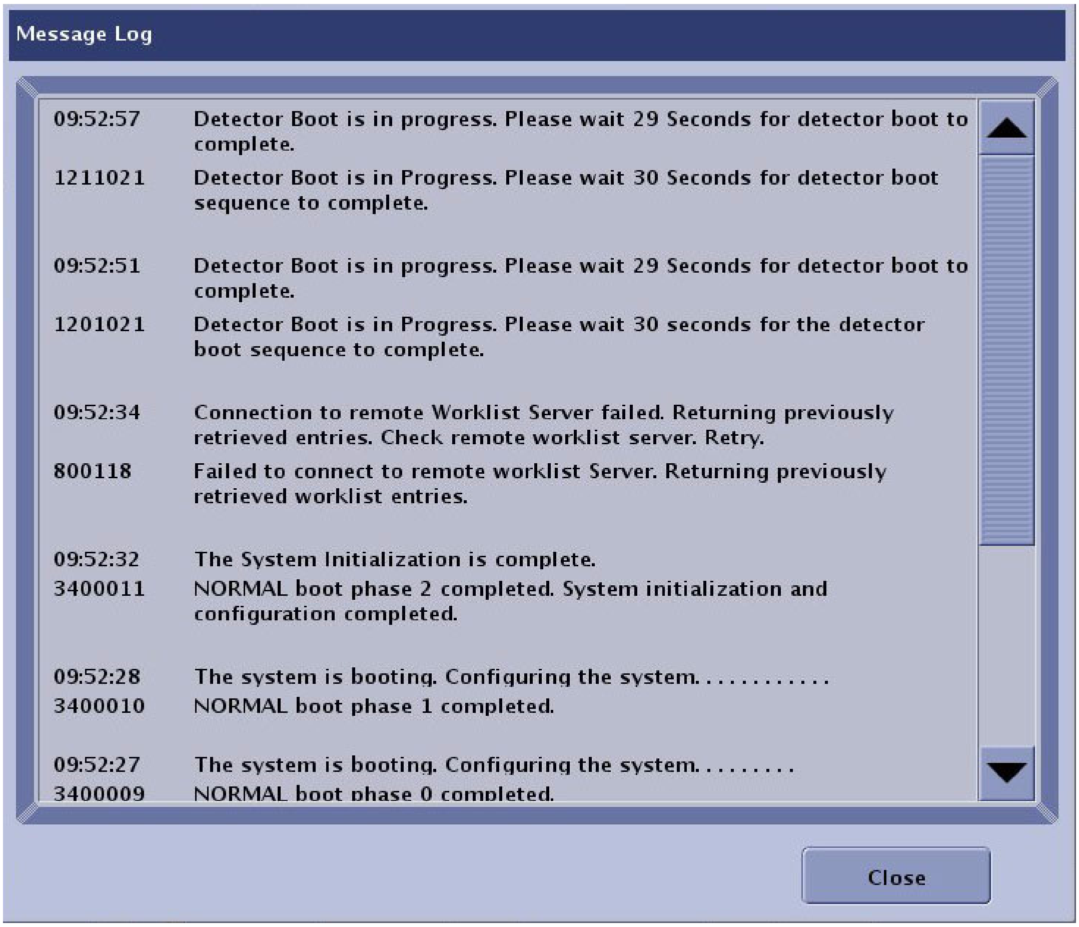
The [MESSAGE LOG] button displays a screen that shows all previous system status messages since the last system restart.

Figure 6-3 Message log



```
09:52:57   Detector Boot is in progress. Please wait 29 Seconds for detector boot to
           complete.
1211021    Detector Boot is in Progress. Please wait 30 Seconds for detector boot
           sequence to complete.

09:52:51   Detector Boot is in progress. Please wait 29 Seconds for detector boot to
           complete.
1201021    Detector Boot is in Progress. Please wait 30 seconds for the detector
           boot sequence to complete.

09:52:34   Connection to remote Worklist Server failed. Returning previously
           retrieved entries. Check remote worklist server. Retry.
800118     Failed to connect to remote worklist Server. Returning previously
           retrieved worklist entries.

09:52:32   The System Initialization is complete.
3400011    NORMAL boot phase 2 completed. System initialization and
           configuration completed.

09:52:28   The system is booting. Configuring the system. . . . . . . . . . .
3400010    NORMAL boot phase 1 completed.

09:52:27   The system is booting. Configuring the system. . . . . . . .
3400009    NORMAL boot phase 0 completed.
```

Manage List / Find Procedures

The Worklist has several features that allow you to find patients and procedures quickly and to organize the list to your preferences.

Search By, Filters, and Sorting allow you to control the display of the procedures in the Worklist.

Search By

The Search By feature finds procedures by column.

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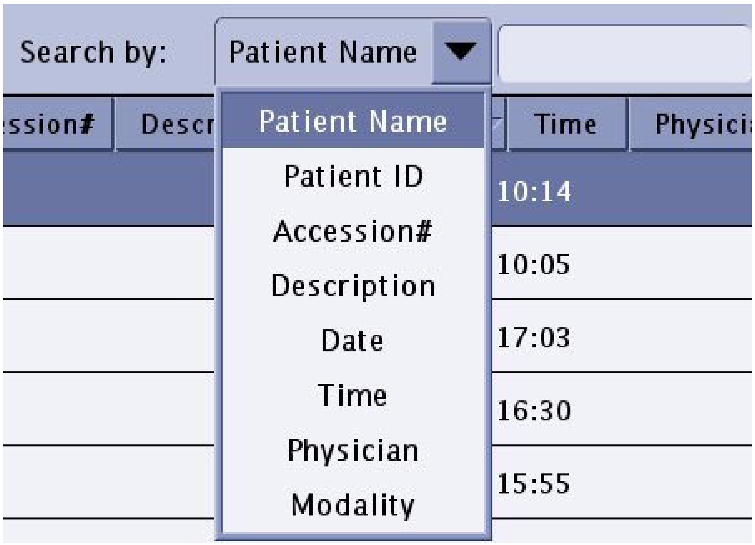
Figure 6-4 Search by



Search by:
Patient Name
ssion#
Descr
Time
Physici
Patient Name
Patient ID
Accession#
Description
Date
Time
Physician
Modality
10:14
10:05
17:03
16:30
15:55

1. Click the button on the Search By drop-down list to select the column you want to search.
   - If the column you want is already selected, begin at step 3.
2. Select the column. For example, Patient Name.
   - The list automatically sorts the selected column.
3. Type the search criteria into the text box. For example, you are looking for patients whose names begin with "J", so you would type "J" into the text box.
   - The list automatically goes to the first procedure whose patient's name begins with "J" and selects it.
   - If the list is long enough, it will scroll to the first item so that it appears at the top of the list.

NOTE: The text box is not case sensitive.

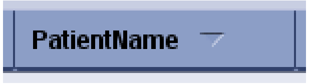
4. Continue typing the search criteria.
   - The list automatically selects the first procedure that matches what you have typed into the text box. This is called an incremental search.
   - If no procedures match what you have typed, the list de-selects all procedures and places the closest match at the top of the Worklist.

Sort by Column

Sorting allows you to organize the procedures by the column of your choice.

1. Click on the column heading you want to sort, or choose the column in the Search By drop-down list. For example, you want to see all the procedures that have a status of “Suspended”, so you click on the “Scheduled Status” column heading.
   - An arrow appears in the column heading to indicate which column is currently being sorted.
2. Click the column heading again to switch between ascending and descending order.
   - An up-pointing arrow indicates that the column is sorted in ascending order. That is, sorted in alphabetical order or numerical order from smallest to largest.
   - A down-pointing arrow indicates that the column is sorted in descending order. That is, sorted in reverse alphabetical order or numerical order from largest to smallest.

Figure 6-5 Column with descending sort

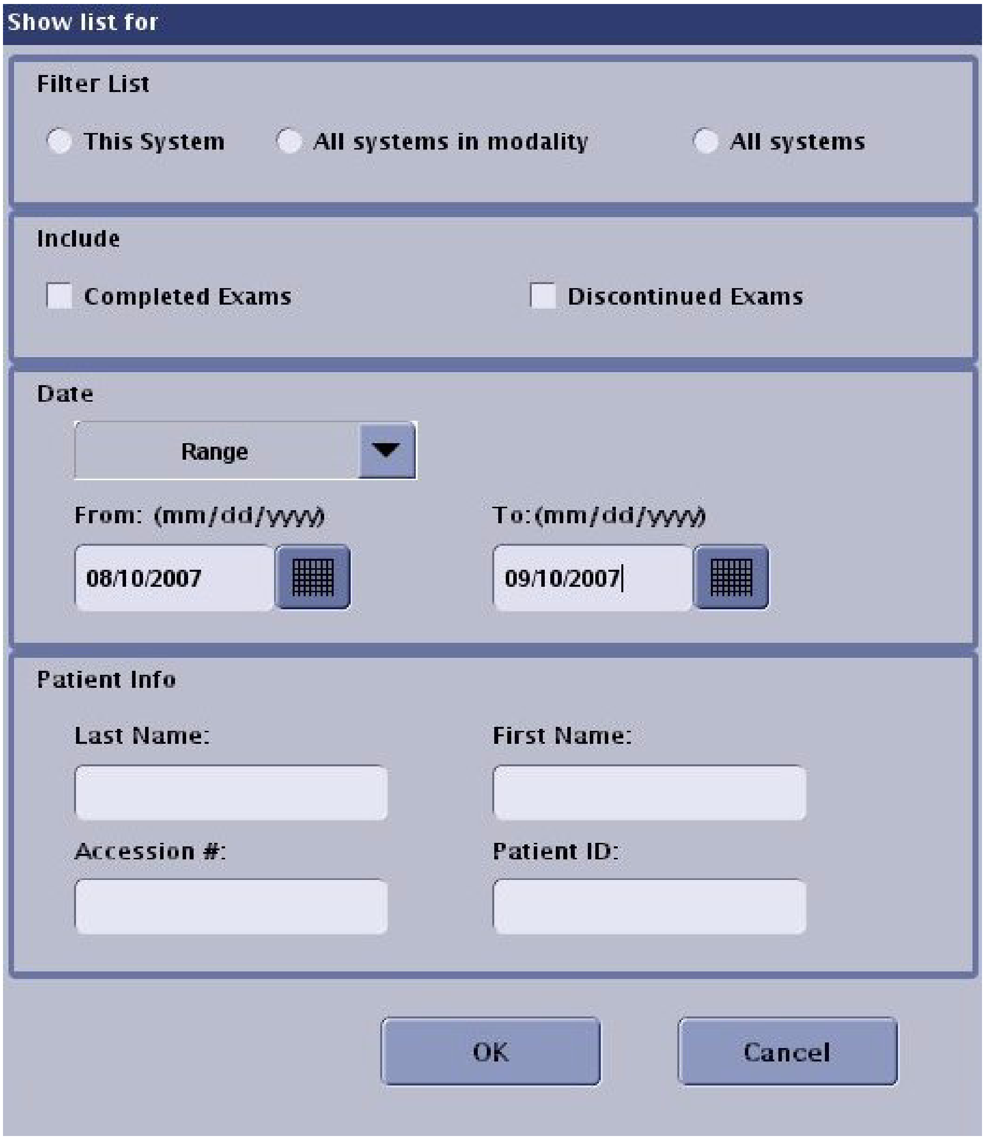


Filter List

Use filters to only display the items corresponding to your chosen criteria, e.g., exams taken only within a specified time period, patients whose last names begin with the letter ‘J’, or patient IDs beginning with the digits ‘547’.

Filters cannot be saved.

Figure 6-6 Worklist filter screen



Show list for
Filter List
○ This System
○ All systems in modality
○ All systems
Include
☐ Completed Exams
☐ Discontinued Exams
Date
Patient Info
Last Name:
First Name:
Accession #:
Patient ID:
OK
Cancel

Date: Range

From: (mm/dd/yyyy) 08/10/2007

To:(mm/dd/yyyy) 09/10/2007

The filter screen has several options (Table 6-3) for accepting or rejecting the information from the Worklist.

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Table 6-3 Filter Acceptance/Rejection Buttons

Function	Description
Filter list	Filters the Worklist items by system or modality. • This system – the local workstation • All systems in modality – all digital x-ray systems in the network • All systems – all imaging systems in the network
Include	Allows you to include or exclude completed or discontinued exams in the filter.
Date	Allows you to select the date of exams to filter by. • All – procedures scheduled for any date • Range - procedures scheduled for a specified range of time • Today – procedures scheduled for the current date
From (mm/dd/yyyy) To (mm/dd/yyyy)	When the “Range” option is selected for the date, allows you to enter dates or pick dates from a calendar screen.
Patient Info	Allows you to filter based on data from the Patient Information screen. Options are: • Last Name • First Name • Accession # • Patient ID The filter may be restricted by any or all of these fields. Leaving a field blank means that it will not be included in the filter.
[OK]	Applies the filter and returns you to the results on the Worklist.
[CANCEL]	Clears the Filter screen and returns you to the Worklist.

Follow this procedure to filter the Worklist.

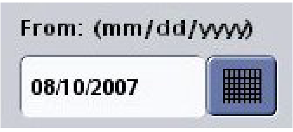
NOTE: The fields may be completed in any order.

1. Click [FILTER LIST] on the Worklist screen.
   - The Filter Screen appears
2. Select the “Filter list ” option.

3. Select the “Include” options.
4. Select the “Date” option.
5. If you selected “Range” for the Date option, enter or select the From / To dates.
   - The current date appears in both the From /To fields by default.

   To select dates from the calendar:
   - Click the [CALENDAR] button.

Figure 6-7 Calendar button

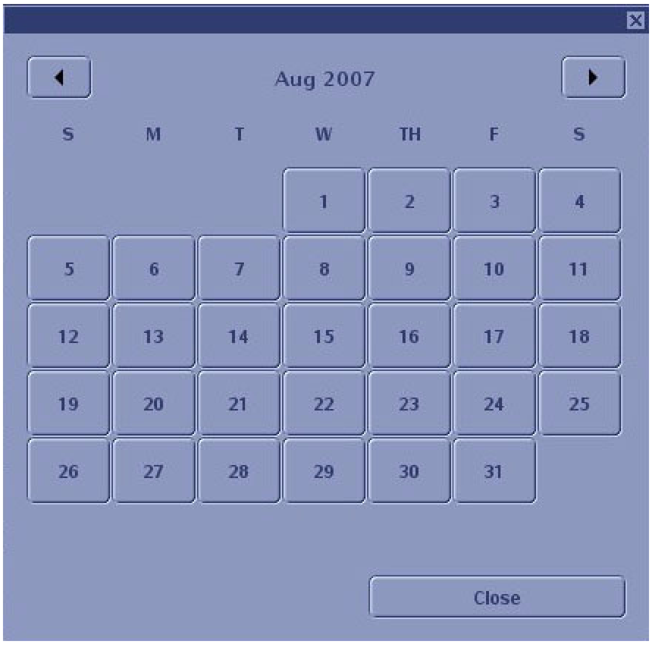


From: (mm/dd/yyyy)

08/10/2007

- The Filter calendar screen appears with the current date selected.

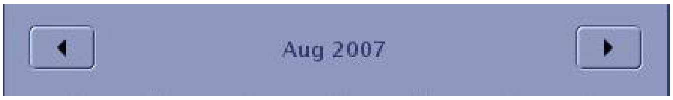
Figure 6-8 Filter calendar screen



S	M	T	W	TH	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

a) Click [◂] to select the previous month, if necessary.

b) Click [▸] to select the next month, if necessary.



c) Click a date to select it.

   – The calendar closes automatically when a date is clicked.

d) Click [CLOSE] to return to the Filter screen.

6. Enter any Patient Infor you want to filter by.
   - You do not need to enter full words or numbers into these fields.
   - Entering more information into these fields will reduce the number of results.
   - Entering less or no information into these fields will increase the number of results.

NOTE: The Patient Info text boxes are not case sensitive.

7. Click [OK].
   - The Show List For screen closes and the Worklist screen appears with only those procedures that met all of the filtering criteria.
   - If no procedures met all the criteria, the Worklist will be blank.
8. Click [REFRESH] to remove the filter.

Refresh

Some systems will automatically refresh the Worklist with data from the HIS/RIS on a regular basis (such as every 10 minutes). However, if your system does not automatically refresh—or you want to refresh the list before the scheduled time — you are able to refresh the list manually.

The Refresh feature also removes any filtering that has been applied. Refer to *Filter List* for more information.

Manual Refresh

Follow this procedure to manually refresh the Worklist.

1. Click [REFRESH] on the Worklist.
   - The Worklist updates with HIS/RIS data and removes any filtering.

NOTE: You will not be able to make selections or access Worklist features while the worklist is refreshing.

NOTE: Refresh does not remove locally added procedures.

Auto Refresh

The Auto Refresh interval is set on the Preferences - Worklist screen in System Utilities. Refer to *Chapter 15: Set Preferences* for more information.

When the system auto refreshes, a message (Figure 6-9) appears: “Auto Refresh in progress. Please wait.” The message remains until the refresh process is complete.

NOTE: You will not be able to make selections or access Worklist functions while the worklist is refreshing.

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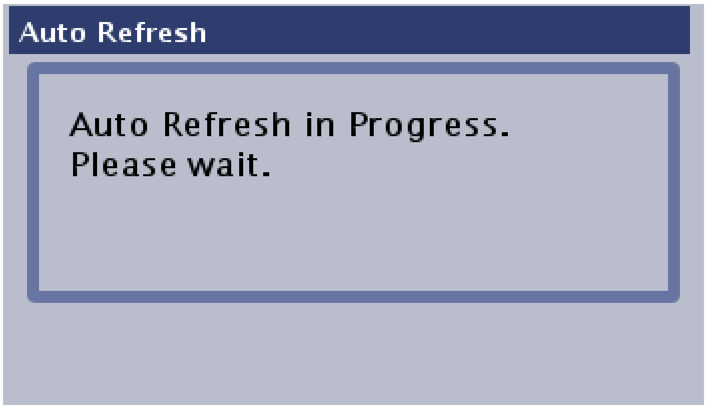
Figure 6-9 Auto refresh message



Auto Refresh in Progress.
Please wait.

Select Procedures

Use this procedure to select a patient from the Worklist. This process assumes the patient already exists on the system. If the patient is not on the worklist, you must add the patient first. Refer to *Add Patient* for more information.

Select a Single Procedure

1. Close or suspend any open exams, if necessary.
    - The Worklist screen appears.
2. Select the procedure from the Worklist.
    - This can be done by clicking on the patient's name from the list or aiming the bar code scanner at the patient's bar code generated by the HIS/RIS system.
3. Refer to *Chapter 7: Image Acquisition* to conduct the exam.

Select Multiple Procedures

You may select multiple procedures for the same patient to begin image acquisition.

NOTE: The Patient Name, Patient ID #, and Birth Date must match exactly in order to be selected.

1. Sort the Worklist by Patient Name.
2. Click on a procedure.
3. Click on another procedure for the same patient.
4. Continue clicking on procedures until all procedures for the patient are selected.
5. Click on any other procedure to deselect the procedures.

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Delete Procedures

You may remove procedures from the Worklist individually.

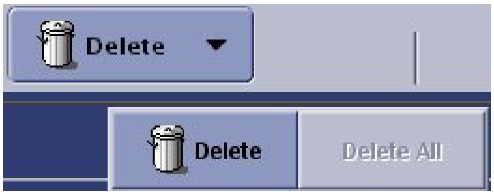
The [DELETE] button is able to delete procedures.

NOTE: Deleted procedures cannot be recovered or “undeleted.”

To delete procedures:

1. Click on the small arrow on the right side of the button.
   - A list appears with the available actions.

Figure 6-10 Delete button options



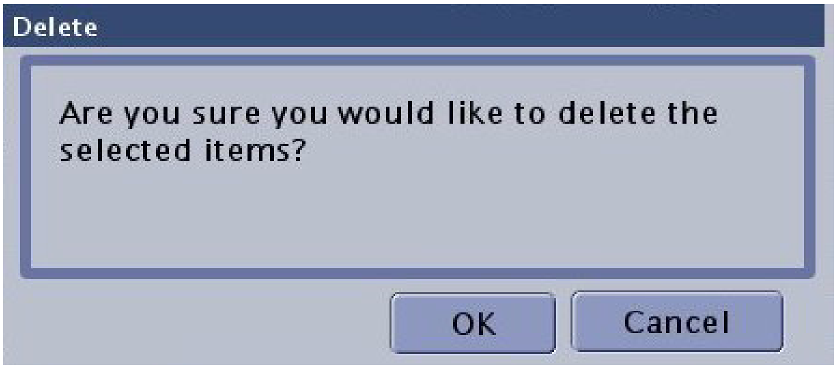
2. Click [DELETE] to remove the procedures.

NOTE: [DELETE] does not remove procedures from the RIS or HIS, and does not remove any exam images from the image database.

Delete a Single Procedure

1. Select the procedure to delete.
2. Click [DELETE].
   - A message appears: “Are you sure you would like to delete the selected items?”

Figure 6-11 Delete confirmation message


Delete

Are you sure you would like to delete the selected items?

3. Click [OK] to delete the procedures or click [CANCEL] to stop deleting the procedures.
   - If you clicked [OK], the selected procedures are deleted and the Worklist appears.
   - If you clicked [CANCEL], the procedures are retained and the Worklist appears.

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Delete Suspended Procedures

Suspended procedures cannot be deleted unless their status is changed to “Completed” or “Discontinued”

1. Select the suspended procedures to delete.
    - A message appears: “The patient entry you are trying to delete is still in progress. Would you like to mark the patient as ‘Completed’ / ‘Discontinued’ and proceed with deletion?”
2. Click [COMPLETE] or [DISCONTINUE].
    - [COMPLETE] changes the Status to of the procedures to “Completed.” If enabled, any acquired images are auto pushed, auto printed, and sent to PACS.
    - [DISCONTINUE] changes the Status to “Discontinued.” Any acquired images are marked as Discontinued and the information is sent to PACS.
    - [CANCEL] closes the message and returns you to the Worklist without deleting procedures.
    - The procedures are removed from the Worklist.

Add Patient / Edit Patient Information

Overview

The Add Patient (Figure 6-12) and Patient Information screens allow you to enter patient and procedure information before starting an exam or to view the information at any time.

NOTE: This screen may also be known as the Medical Procedure Card or MPC.

- To add a patient to the worklist, click [ADD PATIENT] and enter or select the appropriate information. The information can be entered by two methods: manually or with a bar code scanner.

CAUTION: **Make sure the patient’s name, ID number, birth date, and gender information are entered correctly.**

NOTE: Use only standard alphanumeric characters to complete the screen. The use of a question mark (?), forward slash (/), etc., results in an illegal character error message.

- To view the patient information from the Worklist or Image Management screens, select the exam then click [PATIENT INFORMATION]. Patient information is not editable when launched from the Image Management screen.

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- To view the patient information from the Acquisition or Image Viewer screens, click [PATIENT INFORMATION]. Patient information is not editable when launched from these screens.

The screen appears on the same monitor where [PATIENT INFORMATION] was clicked.

Patient Information provided by the HIS/RIS is not editable.

Patient Information entered locally is editable until the exam is started. It is not editable after the exam is started or in progress.

NOTE: The Patient Information button is unavailable when multiple exams are selected at the same time.

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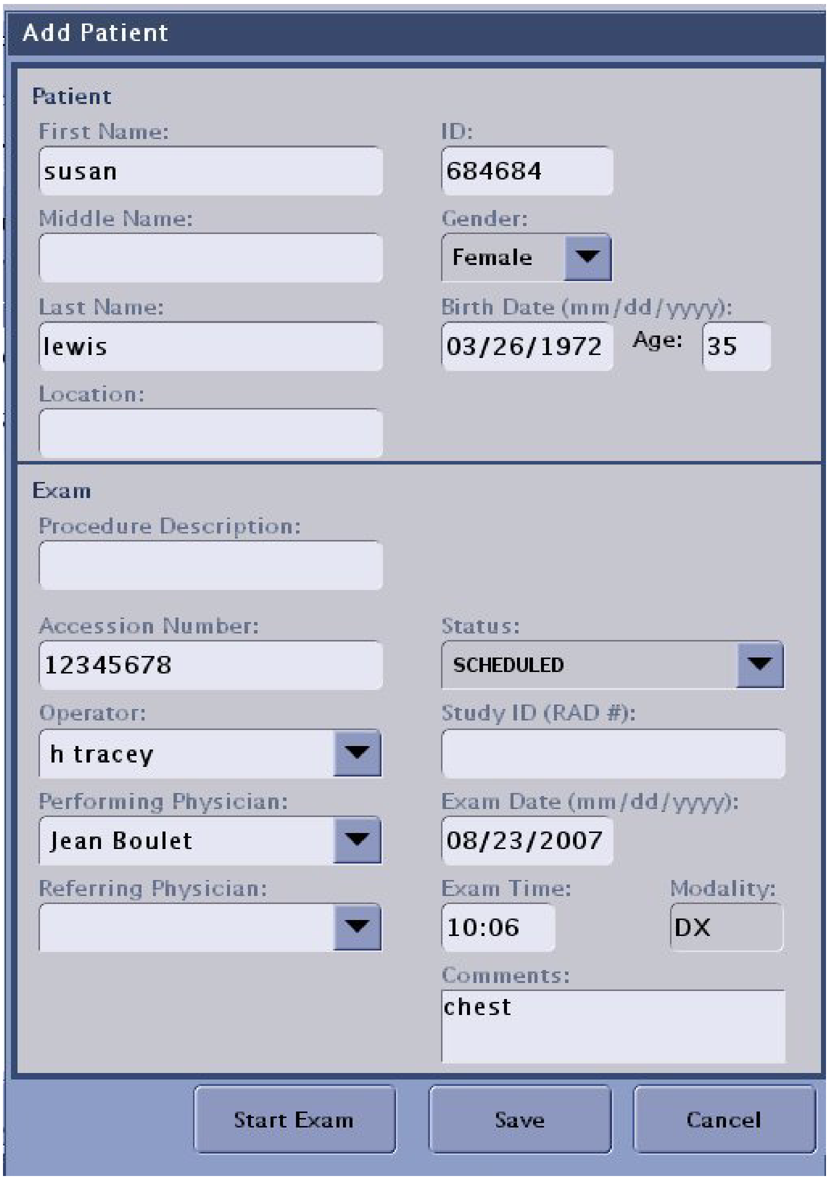
Figure 6-12 Add Patient or Patient Information



Patient

First Name: susan

ID: 684684

Middle Name:

Gender: Female

Last Name: lewis

Birth Date (mm/dd/yyyy): 03/26/1972

Age: 35

Location:

Exam

Procedure Description:

Accession Number: 12345678

Status: SCHEDULED

Operator: h tracey

Study ID (RAD #):

Performing Physician: Jean Boulet

Exam Date (mm/dd/yyyy): 08/23/2007

Referring Physician:

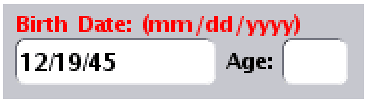
Exam Time: 10:06

Modality: DX

Comments: chest

Table 6-4 Patient Information description

Function	Description
Patient	
First Name	Identifies the patient's first name.
Middle Name	Identifies the patient's middle name or initials.

Function	Description
Last Name	Identifies the patient's last name. **NOTE:** Emergency Exams automatically fill this field with a system-generated identification, which is the word "NEW" followed by a date and time stamp of the second the Emergency Exam button was clicked. For example: NEW040622140345. The exam was initiated in year 04, month 06, day 22, hour 14, minute 03, and second 45.
ID	Identifies the patient's medical record number or any number that distinguishes the patient. This number must be unique.
Birth Date	Identifies the patient's birthday in the format dd/mm/yyyy. If the date is not entered in the correct format, the screen will show the date field in red when [START EXAM] or [SAVE] is clicked.  Birth Date: (mm/dd/yyyy) 12/19/45 Age: In the above example, the year was entered with only 2 digits ("45" instead of "1945").
Age	Identifies the patient's age. The field updates with the correct age when the Birth Date is entered. Entering the Age manually will clear the Birth Date field.
Gender	Defines the sex of the patient. By default, "Other" is selected when the screen first opens.
Exam	
Accession Number	Identifies the patient's accession number.
Operator	Identifies the operator's name or initials. You can use the drop-down list to select commonly used names, or type the name into the drop-down list box. Refer to *Chapter 15: Set Preferences-Viewer Pre-set Annotations* for information on adding names to the drop-down list.

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Function	Description
Performing Physician	Identifies the Radiologist or performing physician. You can use the drop-down list to select commonly used names, or type the name into the drop-down list box. Refer to *Chapter 15: Set Preferences-Viewer Pre-set Annotations* for information on adding names to the drop-down list.
Referring Physician	Identifies the referring physician. You can use the drop-down list to select commonly used names, or type the name into the drop-down list box. Refer to *Chapter 15: Set Preferences-Viewer Pre-set Annotations* for information on adding names to the drop-down list.
Status	Displays the status of the selected exam. When adding a patient, the only option is “Scheduled”. Patient Information options are: • Scheduled – The procedure has been added to the worklist, but the exam has not started. • Suspended – An exam was started but interrupted before completion. The exam may be resumed at a later time. • Complete - The exam is one that has been “Closed” on the Acquire screen or marked as “Complete” on the Patient Information screen. Completed exams are sent to the PACS (where available). • Discontinued – The procedure was opened, but no exposures were taken. The exam may be started at a later time or the procedure deleted. • Active – The exam is currently in progress If the status is “Scheduled”, “Active”, or “Suspended”, the status may be changed to “Discontinued” or “Complete” for exams that are not open or in acquisition. Status is not editable for the following conditions: • If the status is “Complete” or “Discontinued” • If Patient Information is opened from the Image Viewer or Image Management screens
Procedure Description	Describes the procedure or series you are performing.
Exam Date	Displays the scheduled date of the selected exam.

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Function	Description
Exam Time	Defines the date and time for the patient's exam to be performed.
Modality	Displays the modality of the exam.
[START EXAM]	Displays the Acquisition screen in preparation for making exposures. Refer to *Chapter 7: Image Acquisition-Select or Change Protocols* for more information. This also adds the patient name to the Worklist. **NOTE:** This button does not appear if the Patient Information screen is opened from the Image Viewer or Image Management screens.
[SAVE]	Adds the patient to the Worklist or saves changes and closes the Add Patient/Patient Information screen. • If the Save button is selected but all of the data fields have not been filled in, a new patient is created anyway. • If no patient name has been entered, then the patient name will be listed as "New Patient". This allows you to start an exam quickly.
[CANCEL]	Erases all newly entered information and closes the Add Patient/Patient Information screen.

Add Patient

Use this procedure to enter the patient's information into your system.

1. Open the Worklist screen.
    - The Patient Worklist screen appears.
2. Click [ADD PATIENT].
    - The Add Patient screen appears.
3. Enter the patient information.
    - Data many be entered manually or with a bar code reader. Refer to *Chapter 4: Hardware Overview-Acquisition Workstation* for more information.

CAUTION: **Make sure the patient's name, ID number, birth date, and gender information are entered correctly.**

4. Click [SAVE] or [START EXAM].
    - Click [SAVE] to add the patient to the Worklist and return to the Worklist screen.
    - Click [START EXAM] (if available) to add the patient to the Worklist and begin Acquisition.
    - Click [CANCEL] to close the Add Patient screen without saving changes.

NOTE: For a new exam on a existing patient, the patient information cannot be edited.

Edit Patient Information

Patient information can only be edited before any procedure has been opened.

1. Select the procedure from the Worklist.
2. Click [PATIENT INFORMATION].
    - The Patient Information screen appears.
3. Edit the information as necessary.
4. Click [SAVE] to record the changes and return to the Worklist.
    - Clicking [CANCEL] closes the Patient Information screen without saving changes.

CAUTION: **Please check the patient information carefully before start any procedure, since you cannot edit the information again after a procedure has been opened.**

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Chapter 7

Image Acquisition

This section details the process of acquiring images using the digital detector or free cassette.

NOTE: This section covers conducting a basic exam. Refer to for *Chapter 12: Dual Energy Exposure* more information about Dual Energy.

Topics covered include:

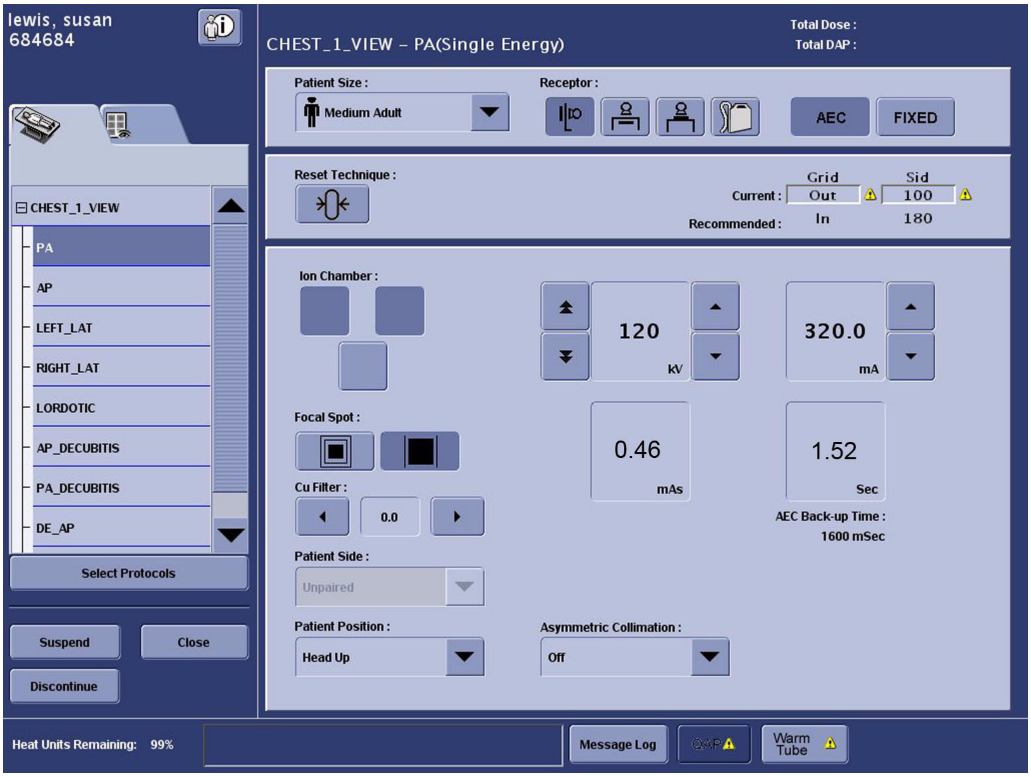
- *Overview*
- *Patient Dose Reporting*
  - *Exceptions*
- *Re-start Completed or Discontinued Exams*
- *Resume Suspended Exams*
- *Select or Change Protocols*
- *Conduct a Digital Table/Radiographic Stretcher Table Exam*
- *Conduct a Wall Stand Exam*
- *Conduct a Digital Cassette Exam*
- *Conduct an Emergency Exam*
- *End Exam*
- *Automatic Protocol Recognition (APR) (Option)*

Overview

The Acquisition screen (Figure 7-1) is where the exam is set up and exposure details are adjusted. This screen appears when you click the [START EXAM], [EMERGENCY EXAM], or [CASSETTE EXAM] buttons on the Worklist or [START EXAM] from the Add Patient screen and select the protocol.

NOTE: If you clicked the [CASSETTE EXAM] button, the Acquisition screen will present a limited set of options. Refer to *Conduct a Digital Cassette Exam* for more information about cassette exams.

Figure 7-1 Acquisition screen before AEC exposure



lewis, susan
684684

CHEST_1_VIEW – PA(Single Energy)

Total Dose :
Total DAP :

Patient Size : Medium Adult

Receptor :

Reset Technique :

	Grid	Sid
Current :	Out	100
Recommended :	In	180

Ion Chamber :

120 kV

320.0 mA

0.46 mAs

1.52 Sec

Focal Spot :

Cu Filter : 0.0

AEC Back-up Time : 1600 mSec

Patient Side : Unpaired

Patient Position : Head Up

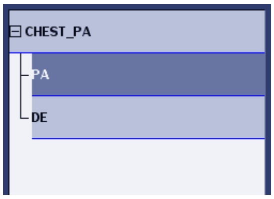
Asymmetric Collimation : Off

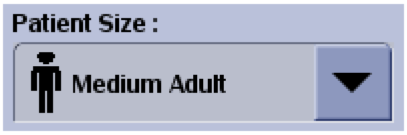
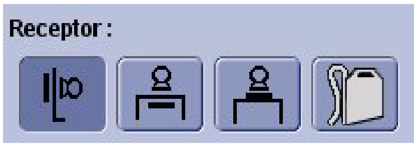
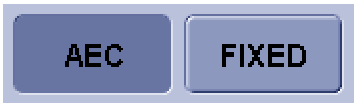
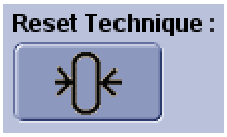
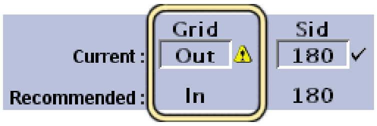
Heat Units Remaining: 99%

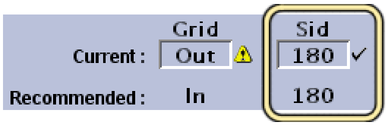
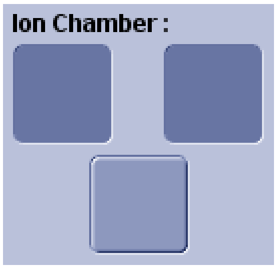
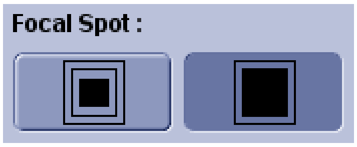
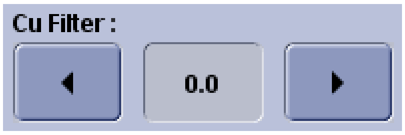
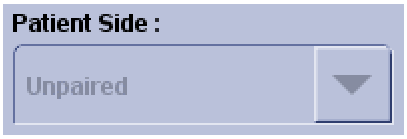
AEC
FIXED
CHEST_1_VIEW
PA
AP
LEFT_LAT
RIGHT_LAT
LORDOTIC
AP_DECUBITIS
PA_DECUBITIS
DE_AP
Select Protocols
Suspend
Close
Discontinue
Message Log
QAP
Warm Tube

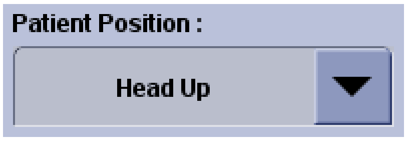
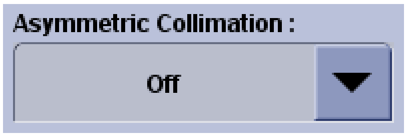
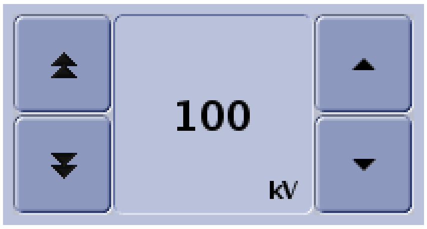
Table 7-1 Image Acquisition functions

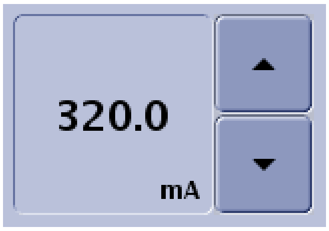
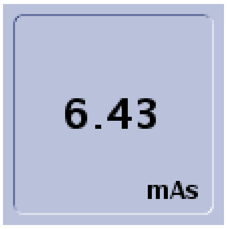
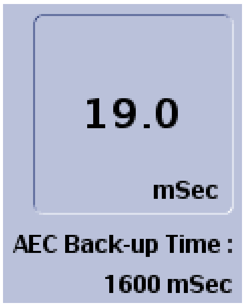
Function	Description
Patient Identification Young, Frank NEW PATIENTID	Identifies the patient for the current procedure.
[PATIENT INFORMATION]	Displays Patient Information screen for the current procedure. Refer to *Chapter 6: Worklist - Add Patient / Edit Patient Information* for more information.
Exam Mode	Click the button to go to the acquistion screen.

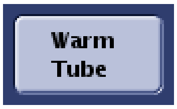
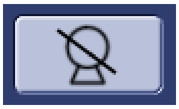
Function	Description
Protocol List 	Lists the available views for the exam and shows which view is currently active.
Protocol Name CHEST_1_VIEW – PA(Single Energy)	Identifies the currently select protocol.
[SELECT PROTOCOLS] Select Protocols	Brings up the Select Protocols screen to add, remove, or change protocols.
[SUSPEND] 	Ends the exam with the intent of continuing at a later time. Does not initiate auto send or auto print, if enabled. Refer to End Exam for more information.
[CLOSE] 	Closes the procedure. If enabled, [CLOSE] sends billing information to the PACS system, auto sends, and auto prints acquired images. Refer to End Exam for more information.
[DISCONTINUE] Discontinue	Ends the exam when the procedure has been opened but the exam cannot continue. Refer to End Exam for more information.

Function	Description
Patient Size:  **Patient Size :** Medium Adult	Allows you to choose the size of the patient being x-rayed. Available options are: • Small Pediatric (infants up to 1 year old) • Medium Pediatric (toddlers to 5 years old) • Large Pediatric (school-age children) • Small Adult • Medium Adult • Large Adult **NOTE:** Pediatric techniques are set at different system speeds then adult techniques. For example, the system speed for a pediatric exam of 70 kV at 32 mAs is 800. The default system speed for an adult exam of 70 kV at 32 mAs is 400.
Receptor:  	Selects the receptor for the protocol. In order from left to right, the options are: • Wall stand • Table • Table Top (free cassette) • Digital cassette **NOTE:** For Table Top exams, the exposure time is limited to two (2) seconds.
[AEC] and [FIXED] (mode)  	Selects AEC or FIXED modes. Refer to *Chapter 10: Exposure Control* for more information.
Reset Technique:  	Resets the technique to the default protocol settings.
Grid position  Grid Sid Current : Out ⚠ 180 ✓ Recommended : In 180	Shows the current grid position, the recommended grid position for this technique, and whether the current position is the recommended position. **NOTE:** Exposure may not be inhibited if the current grid position is not the recommended position.

Function	Description
SID  Grid Sid Current : Out ⚠ 180 ✓ Recommended : In 180	Shows the current SID, the recommended SID for this technique, and whether the current SID is recommended. **NOTE:** Exposure may not be inhibited if the current SID is not the recommended SID.
Ion Chamber: (AEC mode only)  Ion Chamber :	If in AEC mode, selects the ions chambers to use. **NOTE:** When in AEC mode, at least one ion chamber must be selected. Any combination of chambers is allowed. **NOTE:** When in AEC mode, the body part must cover the selected ion chambers in order to achieve the proper exposure.
Focal Spot:  Focal Spot :	Selects a large or small focal spot.
Cu Filter:  Cu Filter : 0.0	Selects the amount of copper filteration. The selectable range is 0.0mm to 0.3mm with increments of 0.1mm.
Patient Side  Patient Side : Unpaired	If conducting an exam on paired anatomy (for example, extremities), selects the side of the patient being x-rayed. Options are: • Both • Left • Right If conducting an exam on unpaired anatomy, the control is disabled, as shown here.

Function	Description
Patient Position:  Patient Position : Head Up	Selects the patient position relative to the detector. The available options change if the currently selected protocol view is for paired or non-paired anatomy. For paired anatomy, the options are: • Digits to Head • Digits to Feet • Digits to Front • Digits to Back For non-paired anatomy, the options are: • Head Up • Head Down **NOTE:** The above lists of positions paired and unpaired anatomy are a general guidelines only. Some views have different options.
Asymmetric Collimation:  Asymmetric Collimation : Off	Allows enabling and selection of Asymmetric Collimation. Options are: • Top • Bottom • Off **NOTE:** Asymmetric collimation is only available if the wall stand receptor is selected and detector =0°.
kV  100 kV	Adjusts the kV. • The up/down buttons on the right of the field adjust the kV by one unit. • The buttons on the left of the field adjust the kV by 10 units. The kVp selection range is 40-150, in 1 kVp increments.

Function	Description
mA  320.0 mA	Adjusts the mA. • The up/down buttons on the right of the field adjust the mA by one unit. • The buttons on the left of the field adjust the mA by 10 units. The mA selection is in Renard steps. The available selections are: 10, 12.5, 16, 20, 25, 32,40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000 (1000 - 80 kW units only). **NOTE:** Not all mA and mAs selections are available at all kV settings.
mAs  6.43 mAs	If in FIXED mode, adjusts the mAs. The mAs selection is in Renard steps. The available selections are: 0.25, 0.32, 0.50, 0.63, 0.8, 1.0, 1.25, 1.6, 2.0, 2.5, 3.2, 4.0, 5.0, 6.3, 8.0, 10, 12.5, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, (mAs are less than 600 with AEC). **NOTE:** Not all mA and mAs selections are available at all kV settings. If in AEC mode, shows the calculated mAs for the current kV and mA after exposure.
Sec  19.0 mSec AEC Back-up Time : 1600 mSec	Shows the exposure time for the technique with the current kV, mA, and mAs settings. If in AEC mode, the AEC back-up time is displayed below the Sec field. The AEC default backup time is two (2) seconds at most.
Heat Units Remaining Heat Units Remaining: 96%	Shows the percentage of heat units remaining. Refer to *Chapter 5: General Information - System Status and Messages* for more information
system status The System Initialization is complete.	Displays the last system status message. **NOTE:** To clear the system status area, open the Message Log and close it again. Refer to *Chapter 5: General Information - System Status and Messages* for more information

Function	Description
[MESSAGE LOG] Message Log	Brings up the message log since the last system re-start. Refer to *Chapter 5: General Information - System Status and Messages* for more information.
[QAP] 	Brings up the screens that allow you to perform QAP. Refer to *Chapter 13: Quality Assurance Process* for more information.
[WARM TUBE] 	Brings up the tube warming status. Refer to *Chapter 5: General Information - Tube Warm Up* for more information.
[EXPOSE HOLD] 	Appears when there is some condition that prevents an x-ray from being taken, such as the exam room door being open or the tube is not in alignment with the detector. Click the button to view a list of all errors and interlocks that are preventing the exposure. The items are removed from the list as they are corrected. The button disappears when all errors and interlocks are corrected.
[iLinq] 	Connect to iLinq remote support services. Refer to *Chapter 5: General Information - ILinq* for more information.

Patient Dose Reporting

In both Fixed and AEC exposure modes, estimates of patient dose are calculated after each acquisition and optionally displayed as part of image annotations. This information is also stored in the DICOM header of each image (the RAW image and its corresponding PROCESSED image) and cannot be edited or modified by the operator.

- Entrance Dose (unit: mGy) is an estimate of entrance dose (air-kerma) at a distance X in front of the wall stand cover or above the tabletop, depending on which receptor was used for acquisition. The default X is 25 cm (- 10 in) but can be modified to site preference by service.

  Entrance dose is stored in DICOM header tag (0018,1405) in units of µGy.

- Dose Area Product or DAP (unit: dGy-cm2) is the entrance dose estimate multiplied by the field-of-view area at the corresponding distance from receptor.

  DAP is stored in DICOM header tag (0018,115e) in units of dGy-cm2.

NOTE: The patient dose estimates are accurately calculated using (1) current system and technique settings and (2) measured values collected during system install/calibration. They are not actual per-image measurements of patient dose.

In manual override mode and Free Cassette mode, the SID displayed on the collimator is used to calculate the DAP.

NOTE: When system is in Digital Cassette Mode, Table Top Mode, or Override Mode, the DAP values shown on the system are the data calculated from SID (100cm or 180cm) displayed on the collimator.

Exceptions

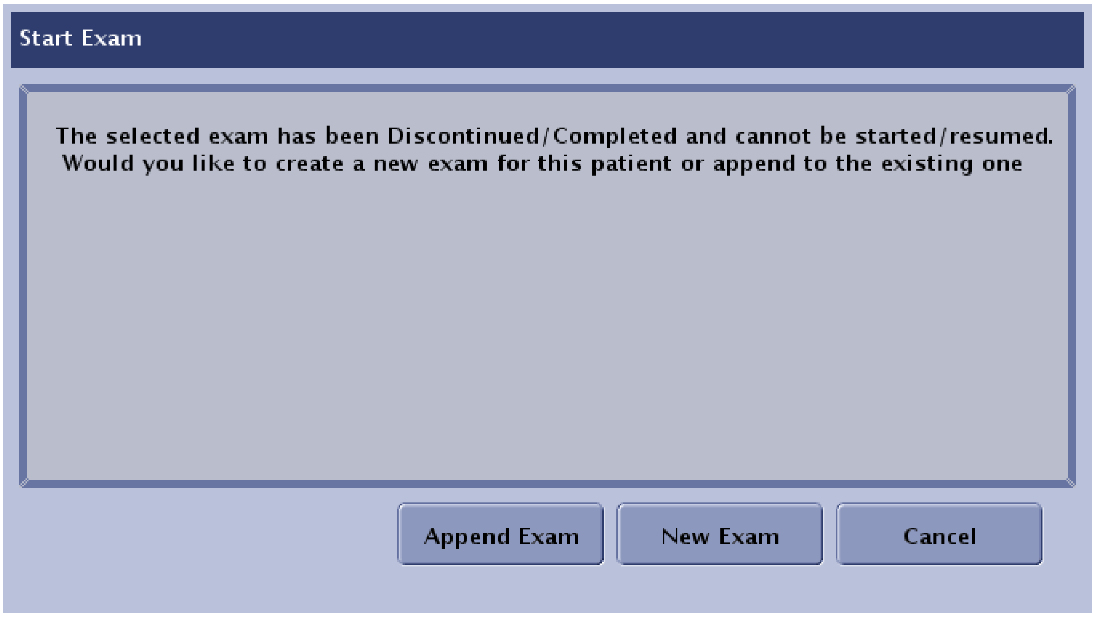
- Non-DR (cassette, table-top, etc.) acquisition modes: The exact SID in this case is not known by the system and depends on patient positioning. A SID of 100 cm (40 in) is assumed for the purpose of estimating entrance dose.
- Dual Energy application: Dose estimates are not provided for Soft-Tissue and Bone images, since these images are not acquired but derived (created by image processing algorithms). Dose estimates are provided for the acquired (High-kVp and Low-kVp) images of a Dual Energy acquisition. Refer to *Chapter 12: Dual_Energy Exposure* for more information.
- Digital cassette.

Re-start Completed or Discontinued Exams

Procedures with a Status of “Completed” or “Discontinued” cannot be re-opened. However, you may create a new exam or append the existing exam.

1. Select the procedure(s) from the Worklist.
2. Click [PATIENT INFORMATION] to verify the patient, if necessary.
3. Click [RESUME EXAM].
    - A message appears: “The selected exam has been Discontinued/Completed and cannot be started/resumed. Would you like to create a new exam for this patient or append to the existing exam?”

Figure 7-2 Start a discontinued or completed exam message



Start Exam

The selected exam has been Discontinued/Completed and cannot be started/resumed. Would you like to create a new exam for this patient or append to the existing one

4. Click the button of the action to perform.
    - [APPEND EXAM] creates a new series within the existing exam and opens the Select Protocols screen.
    - [NEW EXAM] creates a new exam and series for the patient and opens the Select Protocols screen.

NOTE: The new exam will be placed under the same accession number as a new series. Check your hospital conformance standards before selecting this option because it may effect HIS/RIS or PACS formats.

- [CANCEL] closes the message and returns you to the Worklist.

5. Refer to *Select or Change Protocols* to continue with the exam.

Resume Suspended Exams

Suspended exams may be resumed at any time. The process of resuming a suspended exam is the same as starting a new exam.

1. Select the exams from the Worklist.
2. Click [RESUME EXAM].

NOTE: Protocol selections and technique changes are not saved in a suspended exam. Protocols must be reselected and techniques must be re-set.

Select or Change Protocols

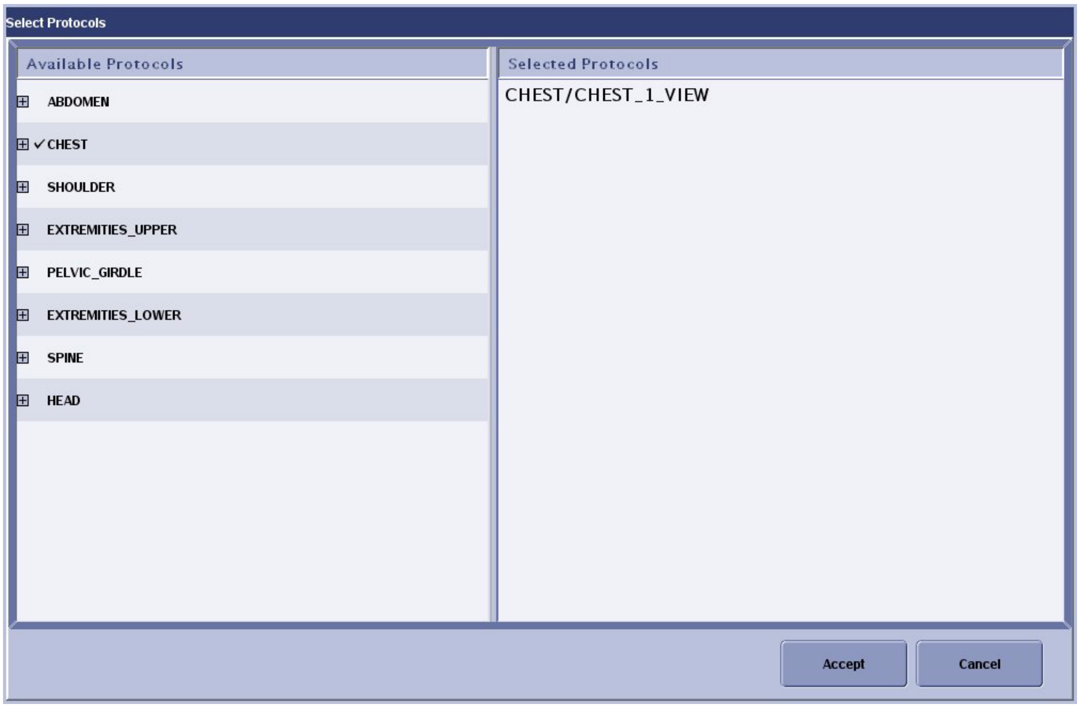
The Select Protocols screen (Figure 7-3) appears when you click [START EXAM] on the Worklist or Add Patient screen or when you click [SELECT PROTOCOLS] on the Acquisition screen.

The select protocols screen is divided into two halves: Available Protocols on the left and Selected Protocols on the right.

- Available Protocols lists all the protocols currently listed in the database, categorized by anatomical region: for example, head, chest, spine, and abdomen. Each category expands to show the exams for that category.
- Selected Protocols lists all currently selected protocols in the following format: anatomy / exam This list automatically updates as protocols are selected or removed.

Refer to *Chapter 15: Set Preferences - Protocols* for information on adding protocols to the protocol database.

Figure 7-3 Select Protocols

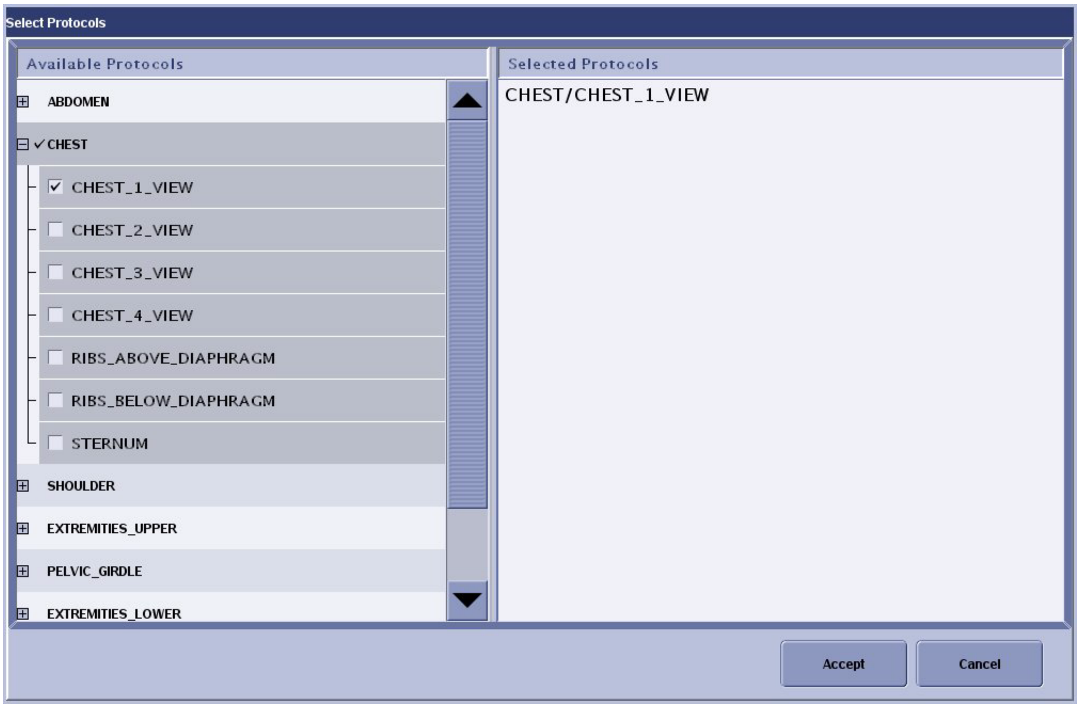

Select Protocols
Available Protocols
ABDOMEN
✓ CHEST
SHOULDER
EXTREMITIES_UPPER
PELVIC_GIRDLE
EXTREMITIES_LOWER
SPINE
HEAD
Selected Protocols
Accept
Cancel

Selected Protocols: CHEST/CHEST_1_VIEW

Use this process to select or change protocols for a procedure.

1. Check the desired protocol category, Chest for example.

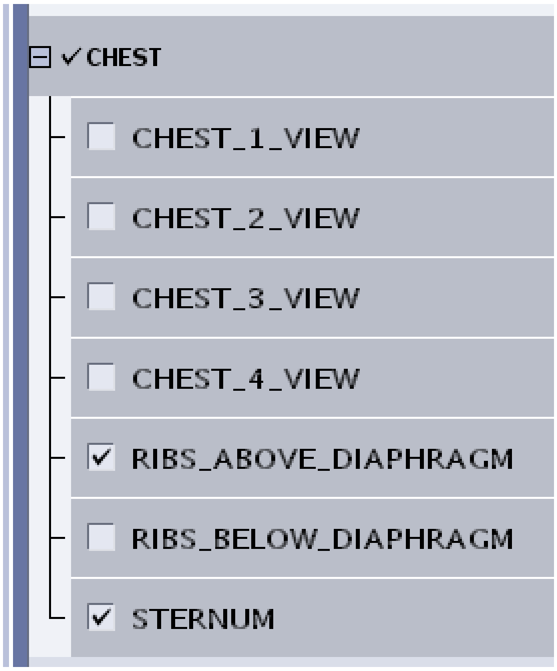
Figure 7-4 Select exam


Select Protocols
Available Protocols
ABDOMEN
✓ CHEST
☑ CHEST_1_VIEW
☐ CHEST_2_VIEW
☐ CHEST_3_VIEW
☐ CHEST_4_VIEW
☐ RIBS_ABOVE_DIAPHRAGM
☐ RIBS_BELOW_DIAPHRAGM
☐ STERNUM
SHOULDER
EXTREMITIES_UPPER
PELVIC_GIRDLE
EXTREMITIES_LOWER
Selected Protocols
Accept
Cancel

Selected Protocols: CHEST/CHEST_1_VIEW

2. Click on an anatomical category to open it.
   - The category expands to show the available exams.
   - Click on the anatomical category name again to close it.
3. Click on an exam to select it.
   - A checkmark appears in the box to the left of the exam name.
   - A checkmark appears next to the category name. This indicates that the category has at least one exam selected.

Figure 7-5 Selected exams



⊟ ✓ CHEST
- ☐ CHEST_1_VIEW
- ☐ CHEST_2_VIEW
- ☐ CHEST_3_VIEW
- ☐ CHEST_4_VIEW
- ☑ RIBS_ABOVE_DIAPHRAGM
- ☐ RIBS_BELOW_DIAPHRAGM
- ☑ STERNUM

- The category and exam names appear in the Selected Protocols list.

4. Click on the exam again to de-select it.
   - The category and exam name are removed from the Selected Protocols list.
5. Repeat process until exams are selected for all procedures.
6. Click [ACCEPT].
   - The Select Protocols screen closes.
   - The Acquisition screen appears on the monitor.
   - Clicking [CLOSE] removes the selections and returns you to the Worklist.
7. Refer to *Conduct a Digital Table / Radiographic Stretcher Table Exam* or *Conduct a Wall Stand Exam* to continue the exam.

Conduct a Digital Table / Radiographic Stretcher Table Exam

This section describes the adjustments required when conducting a table exam.

Refer to *Chapter 3: Quick Step Guides* for an overview of the entire acquisition process.

Follow this process to conduct a table exam.

NOTE: If you need to interrupt the exam and resume it at a later time, click the [SUSPEND] button. You will be returned to the Worklist.

1. Select the Exam and View to perform from the protocol list.
2. Select the Patient Size. The system default is Medium Adult.

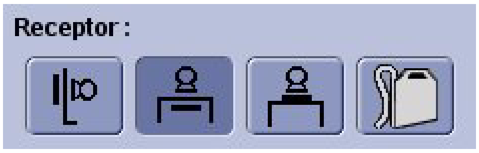
NOTE: To optimize processing for the best image quality, Patient Size should be confirmed for each view. Available options are:

- Small Pediatric (infants up to 1 year old)
- Medium Pediatric (toddlers to 5 years old)
- Large Pediatric (school-age children)
- Small Adult
- Medium Adult
- Large Adult

WARNING: **It is critical to select the proper patient size on the Acquisition screen. The incorrect Patient Size may result in an unnecessarily large radiation dose or multiple exposures.**

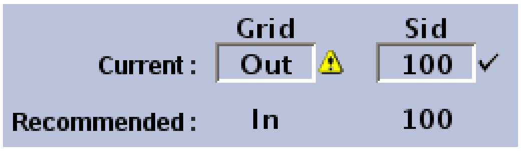
3. Choose the Wallstand Receptor, if necessary.

Figure 7-6 Receptors: Table receptor selected



4. Choose [AEC] or [FIXED] mode (if applicable for the protocol).
5. Confirm or adjust the Grid and SID status.

Figure 7-7 Grid and SID position



	Grid		Sid	
Current :	Out	⚠	100	✓
Recommended :	In		100	

- An alert icon appears if the current Grid or SID is not in the recommended position for the technique.
- A checkmark appears if the current Grid or SID is in the recommended position for the technique.
- Figure 7-7 shows the Grid not in the recommended position and the SID in the recommended position.

NOTE: You may still be able to take exposures even if the grid or SID are not in the recommended positions.

6. Make technique adjustments as necessary: kV, mA, Focal spot, Cu Filter, and Ion chambers (AEC mode only).

NOTE: Click [RESET TECHNIQUE] at any time to reset the technique to the default protocol settings.

7. Position the patient on the table, then position the table above the 90 degree Wallstand.

NOTE: When in AEC mode, the body part must cover the selected ion chambers in order to achieve the proper exposure.

8. Confirm or adjust the Patient Side field, if applicable.
9. Confirm or adjust the Patient Position field.
10. Collimate and shield as appropriate for the exam.

⚠

WARNING: If using AEC mode, collimation must be active over the ion chambers being used. If it is not possible to collimate over the selected ion chambers, then FIXED mode must be used in order to prevent possible patient over-exposure.

11. Have the patient suspend respiration, if required.
12. Make exposure using the hand-switch.
    - The image appears on Image Viewer screen (monitor).

NOTE: After the first exposure, a preview image appears in approximately 7 seconds. It takes about 10 seconds for a fully processed image to appear on the Acquisition screen. A Dual Energy exam will take approximately 18 seconds to appear on the Image Viewer screen.

Conduct a Wall Stand Exam

This section describes the adjustments required when conducting a table exam.

Refer to *Chapter 3: Quick Step Guides* for an overview of the entire acquisition process.

Follow this process to conduct a wall stand exam.

NOTE: If you need to interrupt the exam and resume it at a later time, click the [SUSPEND] button. You will be returned to the Worklist.

1. Select the Patient Size. The system default is Medium Adult.

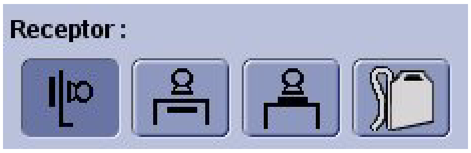
NOTE: To optimize processing for the best image quality, Patient Size should be confirmed for each view. Available options are:

- Small Pediatric (infants up to 1 year old)
- Medium Pediatric (toddlers to 5 years old)
- Large Pediatric (school-age children)
- Small Adult
- Medium Adult
- Large Adult

WARNING: **It is critical to select the proper patient size on the Acquisition screen. The incorrect Patient Size may result in an unnecessarily large radiation dose or multiple exposures.**

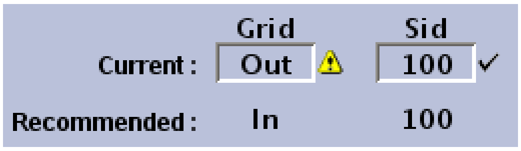
2. Choose the Wall stand Receptor, if necessary.

Figure 7-8 Receptors: Wall stand receptor selected



3. Choose [AEC] or [FIXED] mode (if applicable for the protocol).
4. Confirm or adjust the Grid and SID status.

Figure 7-9 Grid and SID position



	Grid	Sid
Current :	Out ⚠	100 ✓
Recommended :	In	100

- An alert icon appears if the current Grid or SID is not in the recommended position for the technique.
- A checkmark appears if the current Grid or SID is in the recommended position for the technique.
- Figure 7-9 shows the Grid not in the recommended position and the SID in the recommended position.

NOTE: You may still be able to take exposures even if the grid or SID are not in the recommended positions.

5. Make technique adjustments as necessary: kV, mA, Focal Spot, Cu Filter, and Ion Chambers (AEC mode only).

NOTE: Click [RESET TECHNIQUE] at any time to reset the technique to the default protocol settings.

6. Position the patient in front of the wall stand.

NOTE: When in AEC mode, the body part must cover the selected ion chambers in order to achieve the proper exposure.

7. Confirm or adjust the Patient Side field, if applicable.
8. Confirm or adjust the Patient Position field.
9. Confirm or adjust the Asymmetric Collimation, if applicable.
10. Collimate and shield as appropriate for the exam.

⚠

WARNING: **If using AEC mode, collimation must be active over the ion chambers being used. If it is not possible to collimate over the selected ion chambers, then FIXED mode must be used in order to prevent possible patient over-exposure.**

11. Have the patient suspend respiration, if required.
12. Make exposure using the hand-switch.
    - The image appears on Image Viewer screen (monitor).

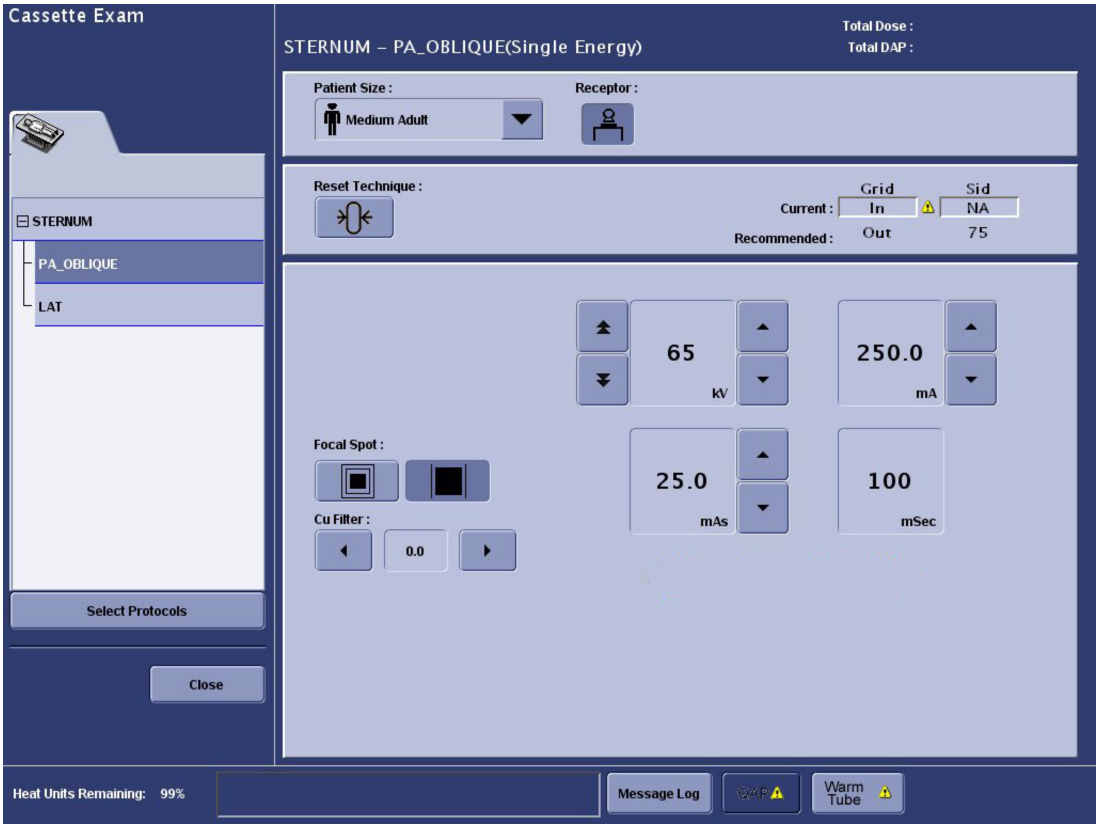
NOTE: After the first exposure, a preview image appears in approximately 7 seconds. It takes about 10 seconds for a fully processed image to appear on the Acquisition screen. A Dual Energy exam will take approximately 18 seconds to appear on the Image Viewer screen.

NOTE: Interlock for tube angle >10° when using WS grid.

Conduct a Digital Cassette Exam

The Digital Cassette Exam function takes an x-ray without digital image acquisition and storage or electronic information sending and retrieval. This is instead of traditional Film Screen or CR cassette.

Figure 7-10 Digital Cassette exam Acquisition screen



Cassette Exam

STERNUM – PA_OBLIQUE(Single Energy)

Total Dose :
Total DAP :

Patient Size : Medium Adult

Receptor :

Reset Technique :

	Grid	Sid
Current :	In	NA
Recommended :	Out	75

65 kV

250.0 mA

25.0 mAs

100 mSec

Focal Spot :

Cu Filter : 0.0

STERNUM
PA_OBLIQUE
LAT

Heat Units Remaining: 99%

Follow this process to conduct a Digital Cassette Exam.

1. Click [DIGITAL CASSETTE EXAM] from the bottom of the Worklist screen

NOTE: Because a digital cassette exam does not use digital image storage, you do not select procedures from the Worklist.

Figure 7-11 [DIGITAL CASSETTE EXAM] button on Worklist

Cassette Exam

- The Select Protocols screen appears.

2. Select the protocols to perform.
3. Click [ACCEPT].
    - The Acquisition screen appears inDigital Cassette Exam mode.
4. Make manual technique adjustments as necessary for the appropriate body part being imaged: kV, mA, mAs, Focal Spot, and Cu Filter.
5. Position the patient with the digital cassette as appropriate for the exam.

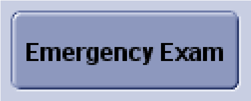
NOTE: It can not be used for digital cassette exam, even if the “automatic positioning” is activated.

6. Collimate and shield as appropriate for the exam.
7. Have the patient suspend respiration, if required.
8. Make exposure using the hand-switch.
9. Process the digital cassette as necessary, depending on the media.
10. Click [CLOSE] to end the exam.
    - The Worklist appears.

Conduct an Emergency Exam

Emergency Exam is a function that allows a patient to be x-rayed without selecting the patient from the Worklist or adding the patient to the Worklist.

Figure 7-12 Emergency Exam button



Emergency Exam is used in the following situations:

- Medical emergency – The patient needs an x-ray taken immediately.
- No patient information available – There is no patient information to enter due to the patient’s medical condition. For example, the patient was found unconscious with no identification.

When the [EMERGENCY EXAM] button is clicked, the system assigns a unique tracking number as the Patient Name. The tracking number is the word “NEW” followed by a date and time stamp of the second the Emergency Exam button was clicked. For example: NEW040622140345. The exam was initiated in year 04, month 06, day 22, hour 14, minute 03, and second 45.

The tracking number is used as the Patient Name on image annotation and as the Patient ID.

NOTE: When the patient information becomes available, images can be copied into the appropriate worklist selection. The selection can be populated to the worklist either by HIS/RIS or manual entry. Refer to *Chapter 8: Image Management - Open Exams and Images* for more information.

Once initiated, an emergency exam is conducted the same way as any other exam.

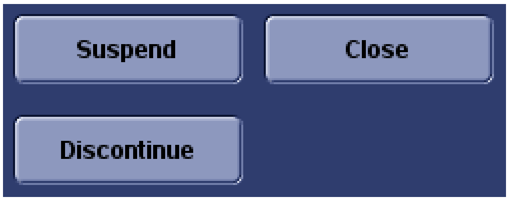
Follow this process to conduct an emergency exam.

1. Click [EMERGENCY EXAM] from the bottom left of the Worklist.
   - The Select Protocols screen appears. Refer to *Select or Change Protocols* for more information.
2. Select the protocols for the exam.
3. Click [ACCEPT].
   - The Acquisition screen appears.
4. Select the protocol to perform from the Protocol List.
5. Acquire images. Refer to *Conduct a Digital Table / Radiographic Stretcher Table Exam*, *Conduct a Wall Stand Exam*, or *Chapter 3: Quick Step Guides* for more information.

End Exam

There are several ways to end an exam: Suspend, Close, and Discontinue. Each method is used for a specific purpose and cover a variety of different situations.

Figure 7-13 Buttons used to end exams



Suspend

Suspend is for situations when you must leave the exam but intend to resume it at a later time. Suspending an exam does not initiate auto send or auto print (if enabled). Images acquired from a suspended exam do not appear on the Image Management screen. Any acquired images are stored in a temporary database until they are committed to the permanent storage database upon closure of the exam.

Close

Close is used when the exam is complete; that is, you have acquired all images and do not intend to continue. If enabled, Close sends the images to PACS and initiates auto print and auto send. The images are committed to the permanent storage database and the exam appears on the Image Management screen.

Discontinue

Discontinue an exam when you have opened the procedure but cannot continue the exam. Any images that were acquired are marked so that they are not used by PACS.

When an exam is discontinued, you must provide the reason for discontinuing the exam. The system sends the status and reason together to the HIS/RIS.

The available reasons are:

- Doctor cancelled procedure
- Equipment failure
- Incorrect procedure ordered
- Patient allergic to media/contrast
- Patient died
- Patient refused to continue procedure
- Patient taken for treatment or surgery
- Patient did not arrive
- Patient pregnant
- Change of procedure for correct charging
- Duplicate order
- Nursing unit cancel
- Incorrect side ordered
- Discontinue for unspecified reason
- Incorrect worklist selection

NOTE: The reason for discontinuing an exam cannot be seen on the Worklist or Patient Information. The information is added to the DICOM header.

Use this procedure to discontinue an exam.

1. Click [DISCONTINUE] from the bottom of the Acquisition screen.
    - A message appears: "Please select a reason for discontinuing this exam."
2. Select the option that best describes why the exam is being discontinued.
    - Choose "Discontinue for unspecified reason" if no other options describe the current situation.

3. Click [OK].
   - The message closes and the Worklist screen opens.
   - The status of the procedure changes to “Discontinued” on the worklist.
   - If multiple procedures were selected, the discontinued status applies to all procedures that were open when the exam was discontinued.
   - Click [CANCEL] to close the message and return to the Acquisition screen.

Automatic Protocol Recognition (APR) (Option)

Automatic Protocol Recognition (APR) is a purchased option that will eliminate the protocol selection process and take you directly to the Acquisition screen for the appropriate exam view after selecting the patient from the Worklist. This feature is designed to help provide better ease of use.

For APR to function, the system protocol database must have matching values for the Requested Procedure Code from the selected Exam in the HIS/RIS Worklist. The Acquisition screen will open with the first view of the first exam selected.

If multiple SPS entries are selected at the same time, the error message will indicate which protocol codes received from the HIS/RIS did not match.

When the feature is enabled at installation, the Field Engineer will run a software script to associate the facility’s exam codes, such as CPT codes, from the HIS/RIS to the Default Protocol Database exams. Any newly created custom exams must have the procedure code assigned to the new exam (Figure 7-14) in the protocol database editor preferences. Refer to *Chapter 15: Set Preferences* for more information.

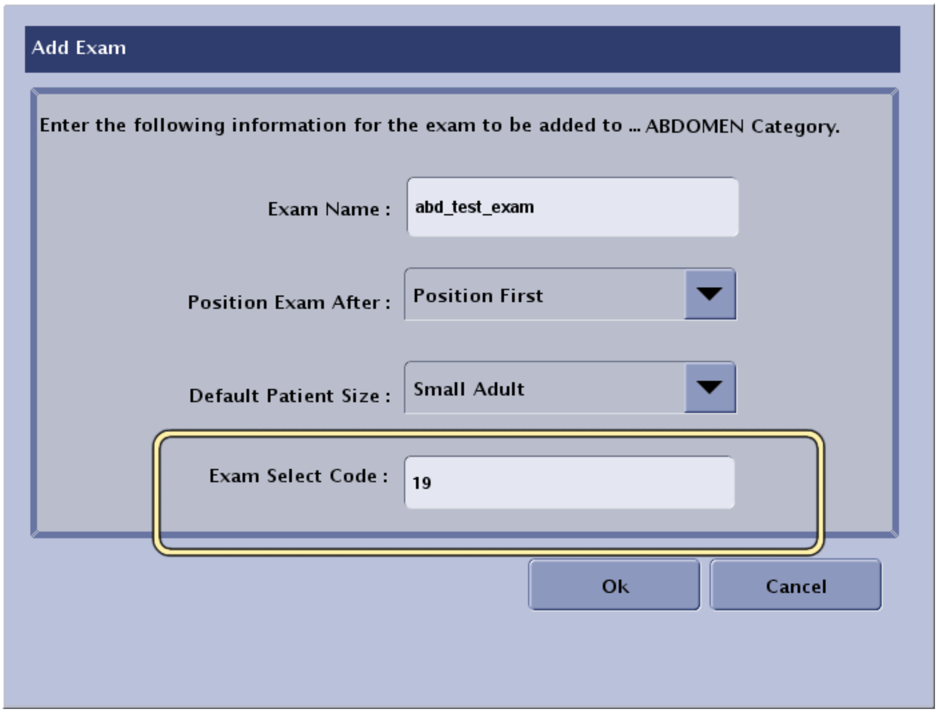
Procedure codes, either entered manually or assigned through a script, will be backed up when the Protocol Database is backed up. Refer to *Chapter 15: Set Preferences* for more information.

If your system has APR enabled but you have manually added a patient or began an Emergency Exam, the following message will appear after you click the [START EXAM] button: “None of the protocol codes match with any of the existing protocols in the database. Please select them manually.” Click the [OK] button to dismiss the message and proceed to select the protocols as previously described.

You are still able to change or select additional protocols from the Acquisition screen using the previously described process.

APR codes are added or edited through the Exam Select Code field on Add Exam or Edit Exam screen (Figure 7-14) of the Edit Protocol Database preferences. Refer to *Chapter 15: Set Preferences* for more information.

Figure 7-14 Add Exam



Add Exam

Enter the following information for the exam to be added to ... ABDOMEN Category.

Exam Name : abd_test_exam

Position Exam After : Position First

Default Patient Size : Small Adult

Exam Select Code : 19

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Chapter 8

Image Management

The Image Management screen (Figure 8-1) shows all the images stored in the selected database source. This screen is used to manage images, copy images to exams, transfer images to network hosts, or save images on CD.

Topics covered include:

- *Overview*
- *Select Image Database Source*
  - *Load Images from a Network Host*
  - *Load Images from a CD*
- *Search List*
  - *Sort by Column*
- *Open Exams and Images*
- *Copy Exams and Images*
  - *Copy Exams to a Network Host*
  - *Copy Images to Another Exam*
  - *Copy Exams to a CD*
- *Delete Exams, Series, or Images*
  - *Lock Exams from Deletion*
- *Make Patient Anonymous*

Overview

The majority of the Image Management screen is devoted to the exam list. Images are organized by exam. Each exam is a row. If multiple exams were acquired in the same session, each exam has its own row on the list. The exam expands to show the series.

Within each exam are "series" of images. A series is a collection of one or more images acquired in a session. Each protocol is a series. A new series is created when a completed exam is appended and every time an image is re-processed (in review mode).

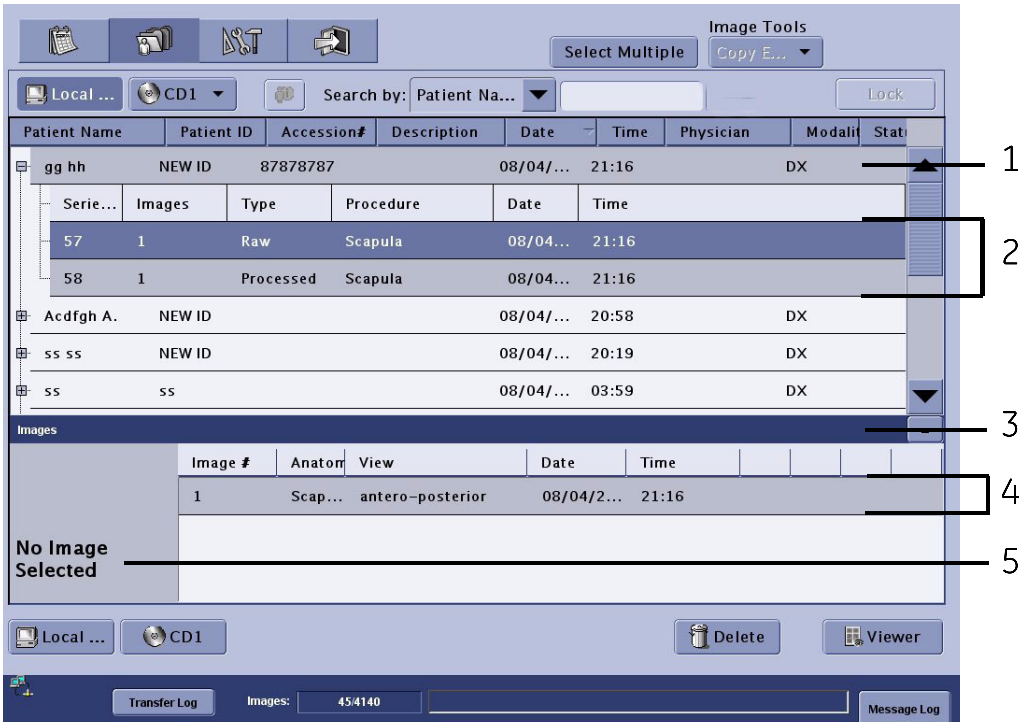
There are two types of image series: raw and processed. Raw images are the exact images that were acquired. Processed images are the raw images with specific processing and image adjustments (such as brightness and contrast) applied. It is possible to create several processed images from one raw image.

Individual images reside within the series. Double-clicking on a series or clicking the [+] button opens the image details section of the worklist. In the Image Details section, each row is an image. Selecting a row makes a small preview image, or “thumbnail,” appear. The image may be opened for viewing or adjustment or deleted.

Selecting multiple exams on the Image Management screen is different than on the Worklist.

- The Image Management screen allows you to select exams that do not have the same Patient ID or Patient Name.
- To select a contiguous group of exams: Hold down the SHIFT key on the keyboard. Click and drag with the mouse to select the exams.
- To select non-contiguous exams: Hold down the CTRL key on the keyboard. Click on individual exams to select.

Figure 8-1 Image Management screen



Patient Name	Patient ID	Accession#	Description	Date	Time	Physician	Modalit	Stat
gg hh	NEW ID	87878787		08/04/...	21:16		DX	
Acdfgh A.	NEW ID			08/04/...	20:58		DX	
ss ss	NEW ID			08/04/...	20:19		DX	
ss	ss			08/04/...	03:59		DX	

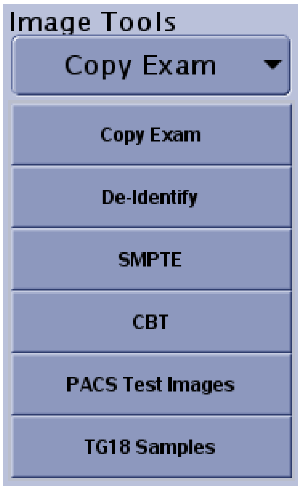
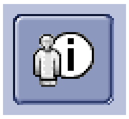
Serie...	Images	Type	Procedure	Date	Time
57	1	Raw	Scapula	08/04...	21:16
58	1	Processed	Scapula	08/04...	21:16

Image #	Anatom	View	Date	Time
1	Scap...	antero-posterior	08/04/2...	21:16

1. Selected exam
2. Series in exam
3. Image detail button
4. Images in selected series
5. Preview of selected image

Table 8-1 Image Management screen functions

Function	Description
Multiple selection Select Multiple	Clicking this icon can select studies from different patients or different series and images from the same patient.

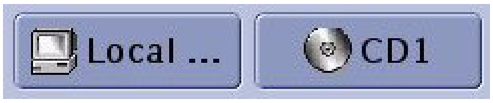
Function	Description
Image Tools  Image Tools Copy Exam Copy Exam De-Identify SMPTE CBT PACS Test Images TG18 Samples	Performs various functions on selected exams. Available options are: • Copy Exam – Allows all exam images for a patient to be copied to another patient, to another location, or to CD. • De-identify – Makes the patient anonymous (removes all identifying information, including Name, ID, and accession number). • SMPTE – Allows services personnel to access the SMPTE pattern for system calibration. • CBT – If available, launches Computer Based Training for the system. If Computer Based Training is not available, the option is disabled. • PACS images • TG18 **NOTE:** It is not expected that you will need to access the SMPTE pattern or test images during the course of a normal day. Test images are typically used to calibrate the system or to determine the cause of quality problems.
Source	Selects the source of images to view (e.g., the local workstation, networked computers, or a CD).
[PATIENT INFORMATION] 	Shows the Patient Information screen for the selected procedure. **NOTE:** Patient Information cannot be edited once an exam has started. Refer to *Chapter 6: Worklist-Add Patient / Edit Patient Information* for more information.
Search by Search by: Date	Searches for procedures by the selected the column name in the drop-down list and the search criteria entered into the text box.
[LOCK] or [UNLOCK] 	Locks the selected exams from deletion. If a locked exam is selected, the button name changes to [UNLOCK]. [UNLOCK] removes the lock from the selected exams.
[DELETE] 	Deletes the selected exams or images from the local database.

Function	Description
[VIEWER] 	Opens the Image Viewer screen and shows the images in the selected series. Images may be adjusted on the Image Viewer screen. Refer to *Chapter 9: Image Viewer* for more information.
[TRANSFER LOG] Transfer Log	Shows a list of transferred exams and their destinations.
System Status The System Initialization is complete.	Displays the last system status message. Refer to *Chapter 5: General Information-System Status and Messages* for more information.
[MESSAGE LOG] Message Log	Brings up the message log since the last system re-start. Refer to *Chapter 5: General Information-System Status and Messages* for more information.
Image counter Images: 45/4140	To display the total image number (the number at the right side) the system can store and the total image number system has already stored in 10MB.
Local read and CD-ROM read 	These two icons are at the left top of the screen. Click the "Local" icon to display all the studies in the system. Click the "CD1" icon to display all the studies in the CD which has been inserted into the CD-ROM already.
Local write and CD-ROM write 	These two icons are at the left bottom of the screen. Click the "Local" icon to copy the selected images to the local PC which has been connected to this system. Click the "CD1" icon to copy the selected images to the CD which has been inserted into the CD-ROM already.

Select Image Database Source

The Source buttons allow you to load and work with images from different locations, such as a CD, network host, or the local workstation.

Figure 8-2 Image sources



- Local – shows exams and images stored on the local workstation.
- CD1 – shows exams and images stored on a CD. The options for the drop-down list are CD and Eject CD.

Load Images from a Network Host

Follow this process to access images stored on a network host.

1. Select the network host from the drop-down list, if necessary.
    - The filter screen appears. Refer to *Chapter 6: Worklist-Manage List / Find Procedures* for more information.
2. Complete the Filter screen as appropriate.
3. Click [OK].
    - A message appears: "Retrieving requested information."
    - The Image Management screen list updates with exams from the selected source.

Load Images from a CD

Follow this process to access images stored on a CD.

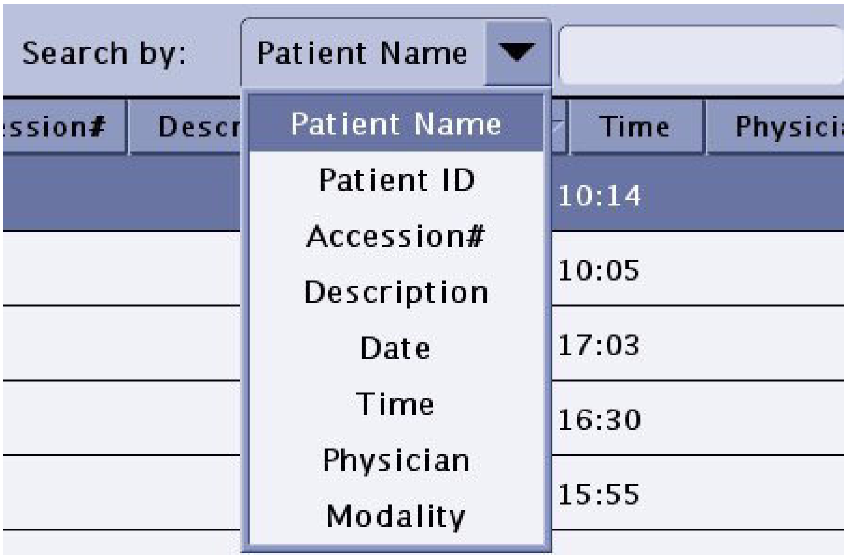
1. Use the CD1 button to open the CD tray on the workstation computer. Press the arrow and select EJECT CD from the drop-down list.
    - The CD tray opens.
2. Place the CD with images into the CD tray.
3. Close the CD tray. Press the Eject button below the tray or gently nudge the CD tray towards the computer.
4. Click [CD1].
    - The exam list updates to show the images stored on the CD.
5. Select the exams.
6. Copy the exams to the Local database. Refer to *Copy Exams and Images* for more information.
7. Open the exams from the Local database.

NOTE: If the exams are being viewed on a computer that has the DICOM viewer installed, images may be viewed directly from the CD.

Search List

The Search By feature finds procedures by column.

Figure 8-3 Search by


Search by:
Patient Name
ssion#
Descr
Patient Name
Patient ID
Accession#
Description
Date
Time
Physician
Modality
Time
Physici
10:14
10:05
17:03
16:30
15:55

1. Click the button on the Search By drop-down list to select the column you want to search.
    - If the column you want is already selected, begin at step 3.
2. Select the column. For example, Patient ID.
    - The list automatically sorts the selected column.
3. Type the search criteria into the text box. For example, you are looking for patients whose names begin with “J”, so you would type “J” into the text box.

NOTE: The text box is not case sensitive.

4. Continue typing the search criteria.
    - The list automatically selects the first procedure that matches what you have typed into the text box. This is called an incremental search.
    - If no procedures match what you have typed, the list de-selects all procedures and places the closest match at the top of the Worklist.

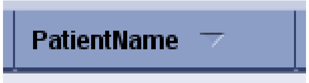
Sort by Column

Sorting allows you to organize the procedures by the column of your choice.

1. Click on the column heading you want to sort, or choose the column in the Search By drop-down list. For example, you want to see all the procedures that have a status of “Suspended”, so you click on the “Scheduled Status” column heading.
    - An arrow appears in the column heading to indicate which column is currently being sorted.

2. Click the column heading again to switch between ascending and descending order.
   - An up-pointing arrow indicates that the column is sorted in ascending order. That is, sorted in alphabetical order or numerical order from smallest to largest.
   - A down-pointing arrow indicates that the column is sorted in descending order. That is, sorted in reverse alphabetical order or numerical order from largest to smallest.

Figure 8-4 Column with descending sort



Open Exams and Images

Follow this process to open exams and images for viewing.

1. Double-click the exam to open it (or, select the exam and press ENTER on the keyboard).
   - The series for the exam expands below the exam.
2. Double-click the series to open it (or, select the series and click [+] image details).
   - The image detail opens.
3. Select the image.
   - A preview thumbnail appears.
4. Double-click on the image (or, select the series and click [VIEWER]).
   - The selected series opens on the Image Viewer screen with the selected image displayed.

Copy Exams and Images

Exams (including all series and images) may be copied to a network host or to a CD. The images from an exam may be copied to another exam.

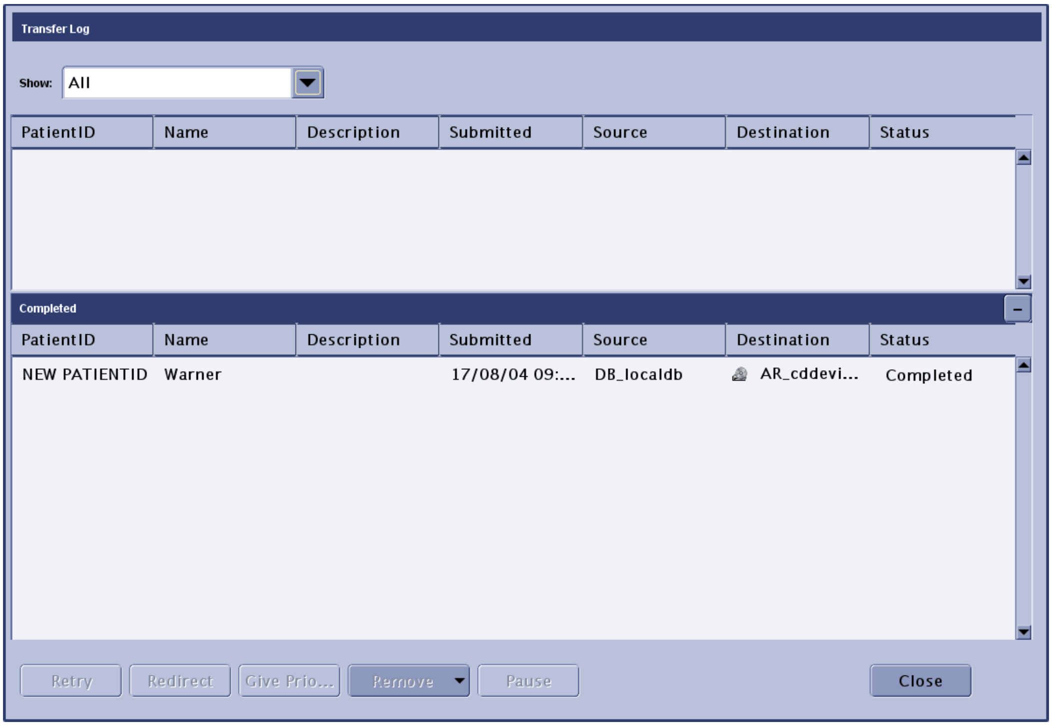
NOTE: Copying exams does not remove the exam from its original location.

Copy Exams to a Network Host

Exams may be copied to a configured network location. Refer to *Chapter 15: Set Preferences-Network Connections* for information about configuring network hosts.

1. Select the exams to copy.
2. Switch to the network Destination, if necessary.

3. Click [DESTINATION].
   - A message appears: “Images will be copied to the selected exam. Images will not automatically be removed from the source exam.”
4. Click [OK].
   - If there is a problem and the exams cannot be copied to the selected network host, a message appears: “The network destination is not responding. If the problem persists contact your network administrator.”
   - Click OK to close the message. Try copying the exams at a later time.
   - To see the status of the exams being copied, click [TRANSFER LOG] at the bottom of the Image Management screen.
   - The Transfer Log screen appears.
   - Click [CLOSE] to close the screen and return to the Image Management screen.



Show: All

PatientID	Name	Description	Submitted	Source	Destination	Status

Completed

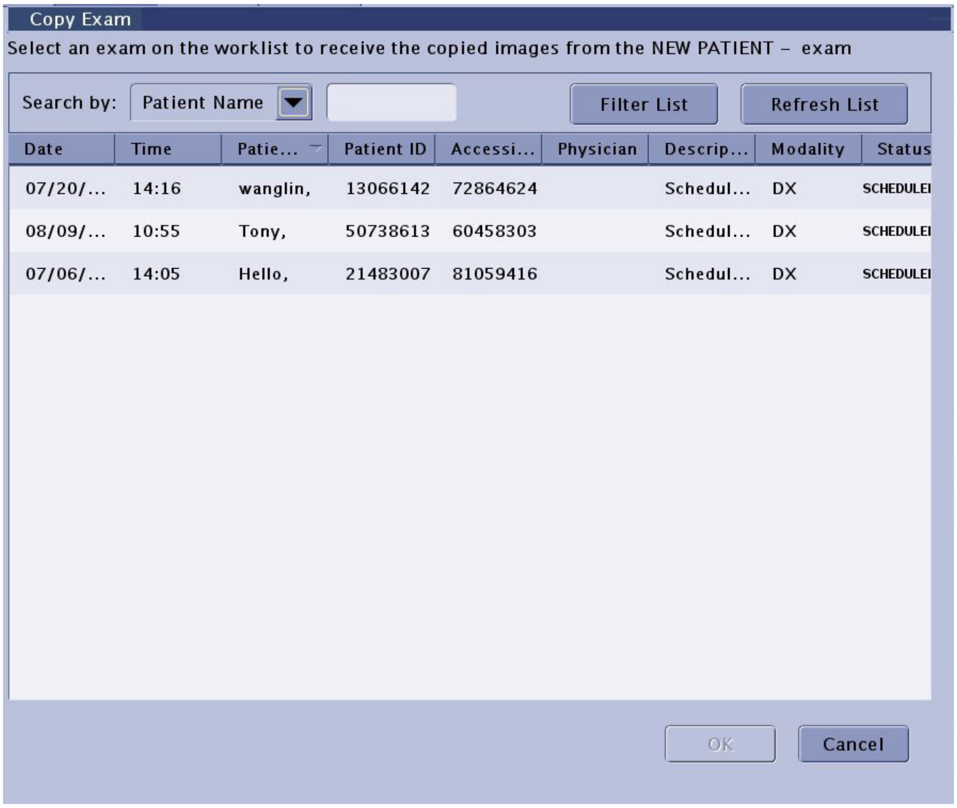
PatientID	Name	Description	Submitted	Source	Destination	Status
NEW PATIENTID	Warner		17/08/04 09:...	DB_localdb	AR_cddevi...	Completed

Copy Images to Another Exam

This process is used to copy images from one exam to another. Copying images is used to consolidate the images from multiple exams for a single patient or to reconcile patients to exams. For example, images taken for an emergency exam can be assigned to the patient’s real name once the patient’s information is known or if images were acquired for the wrong Worklist entry.

NOTE: You can only copy the images from one exam at a time.

1. If you are assigning an emergency exam to a patient, you may need to add the patient to the Worklist first.
    a) On the Worklist screen, click [ADD PATIENT].
    b) Enter the patient's information. Refer to [Chapter 6: Worklist-Add Patient / Edit Patient Information]() for more information.
    c) Click [SAVE].
2. On the Image Management screen, select the exam to copy.
3. Switch the [IMAGE TOOLS] button to COPY EXAM, if necessary.
    - The Copy Exam screen appears.



Copy Exam

Select an exam on the worklist to receive the copied images from the NEW PATIENT – exam

Search by: Patient Name

Date	Time	Patie...	Patient ID	Accessi...	Physician	Descrip...	Modality	Status
07/20/...	14:16	wanglin,	13066142	72864624		Schedul...	DX	SCHEDULEI
08/09/...	10:55	Tony,	50738613	60458303		Schedul...	DX	SCHEDULEI
07/06/...	14:05	Hello,	21483007	81059416		Schedul...	DX	SCHEDULEI

    - The Copy Exam screen shows all available exams for the current location and all Worklist entries with the status of "Scheduled".
4. Search or Filter the exam list to locate the destination exam.
5. Select the exam where you want the images copied to.
6. Click [OK].
    - A message appears: "Images will be copied to the selected exam. Images will not automatically be removed from the source exam."

7. Click [OK].
   - The message closes.
   - A message appears: “Retrieving information. Please wait.”
   - [CANCEL] stops the copy process, closes the message, and returns you to the Image Management screen.
   - All series and images are copied to the exam.

Copy Exams to a CD

Exams may be copied to a CD for archiving purposes, to send to a location that is not within the network, or to send with a patient’s medical records.

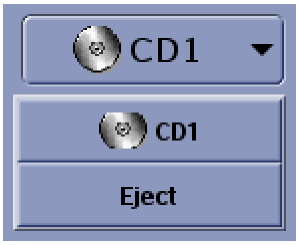
NOTE: The CDs used for copying images must be recordable. That is, the CD should be labeled “CD-R” (recordable) or “CD-RW” (re-writable).

NOTE: You cannot copy exams to a CD that already has exams saved on it. You will receive a “Not enough space” error when you attempt to write to the CD, even if there is enough space. Always use a new, blank CD.

1. Open the CD tray. (Select Eject from the [CD1] drop-down list.)

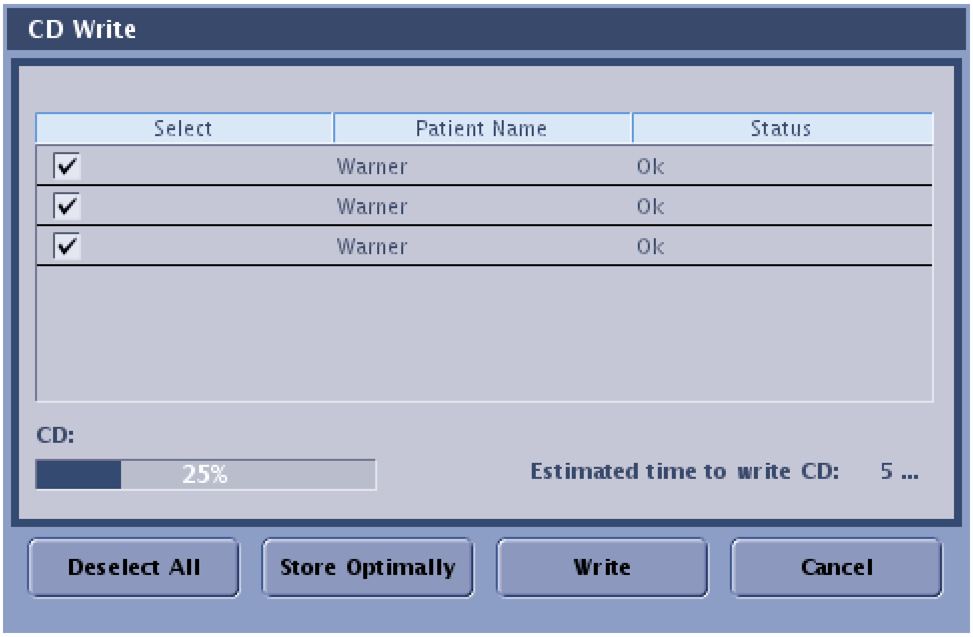
NOTE: Pressing the Eject button on the workstation PC does not open the CD tray. When working on the Image Management screen, always use the Eject option from the [CD1] drop-down list (Figure 8-5).

Figure 8-5 CD1 button drop down list



2. Insert a blank CD into the tray.
3. Close the CD tray.
4. Select the exams to copy.

5. Click the **Destination** [CD1].
   - The CD Write screen appears.
   - [DESELECT ALL] un-checks all exams on the list.



Select	Patient Name	Status
☑	Warner	Ok
☑	Warner	Ok
☑	Warner	Ok

CD: 25%

Estimated time to write CD: 5 ...

   - [STORE OPTIMALLY] automatically checks if the selected images will fit on the CD. It will automatically un-check any items that cannot fit on the CD.
   - [WRITE] begins the copying process.
   - [CANCEL] closes the screen and returns you to the Image Management screen.
6. Confirm the exams to be copied. Un-check any exams that you do not want saved to the CD.
7. Click [WRITE].
   - The CD begins copying. The light on the front of the computer flashes yellow as the data is being written.
   - To see the status of the exams being copied, click [TRANSFER LOG] at the bottom of the Image Management screen.
   - The Transfer Log screen appears.
   - Click [CLOSE] to close the screen and return to the Image Management screen. Before the copy is completed, the CD tray will open first and close again. Check the Transfer Log at this moment, if the transfer status log disappear and the log appears in the list underneath the Transfer Log screen, the transfer is completed.

CAUTION: **Do check the Transfer Log before remove the CD, if remove the CD before the transfer status log appears in the underneath part of the transfer log screen, copy images to CD after this operation might fail until reset the system.**

8. Click " Eject CD1 - Eject CD" to remove the CD.
9. Label the CD and store in a safe place.

Delete Exams, Series, or Images

Exams, series, and images may be deleted from the selected database source from the Image Management screen.

Follow this process to delete exams, series, and images.

1. Select the Source, if necessary.

NOTE: Items cannot be deleted from a CD.

2. Unlock exams, if necessary.
   - Refer to *Lock Exams from Deletion* for more information.
3. Select the items to delete.
   - The items may be exams, series with an exam, or images within a series. Multiple items may be selected and deleted at once.
4. Click [DELETE].
   - A message appears: "Are you sure that you would like to delete the selected items?"
5. Click [OK].
   - The message closes.
   - The items are deleted from the Image Management screen.
   - Clicking [CANCEL] closes the message and the items remain on the Image Management screen.

Lock Exams from Deletion

The Image Management screen allows you to prevent, or "lock", exams from being deleted. The exam can only be deleted if the lock is removed, or "unlocked." The lock prevents exams from being deleted by other operators and from Auto Delete. .

Locked exams can still be copied, transferred, and viewed.

Only exams can be locked. Individual series or images cannot be locked.

Follow this process to lock and unlock exams.

1. Select the exams to lock.
2. Click [LOCK].
   - The lock icon appears in the status column of all selected exams.

     🔒

   - The Lock button changes to Unlock.

Unlock Exams

Follow this process to unlock exams so that they may be deleted.

1. Select the locked exams.
   - The Unlock button becomes active.
2. Click [UNLOCK].
   - The lock icon is removed from the status column of the selected exams.
   - The exams may now be deleted.

Make Patient Anonymous

There may be times when you want the name of a patient to be kept confidential to maintain patient privacy. You can do this using the De-Identify feature. This feature allows you to create an anonymous set of images.

The patient examinations are copied and used to create a new patient, with the name “Anonymised patient” and a unique, randomly created Patient ID as shown in Figure 8-7.

NOTE: Once an anonymous exam is created, there is no way to recover the patient’s identifying information.

De-Identify is an option available from the Image Tools button (Figure 8-6).

Figure 8-6 Image Tools button

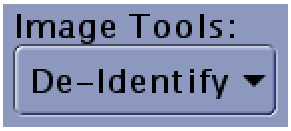
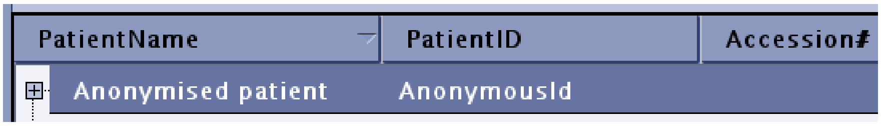


Figure 8-7 Anonymous patient



PatientName	PatientID	Accession#
⊞ Anonymised patient	AnonymousId	

Use this process to make exam images anonymous:

1. Select the patients to make anonymous.
2. Switch the Image Tools button to [DE-IDENTIFY], if necessary.
    - A message appears: “The selected exams will be copied without patient identification. The originals will not be deleted.”
3. Click [OK].
    - The Image Management screen updates with copied, anonymous exams.

Chapter 9

Image Viewer

The Image Viewer screen (Figure 9-1) appears on the monitor once an exposure is taken in a live exam or when an image series is chosen from the Image Management screen for review. This screen is where images are adjusted and viewed.

NOTE: This section covers the Viewer functions for Single Energy images. Refer to *Chapter 12: Dual Energy Exposure* for more information about Dual Energy.

Topics covered include:

- *Overview*
- *Tool Selection List*
- *Select Images*
- *Change Viewing Format and Size*
- *Adjust Images*
- *Annotate Images*
  - *Customize Annotations*
  - *Add Image Annotations*
  - *Delete Image Annotations*
- *Re-process Images*
- *Dose Exposure Indicator (DEI) Function*
  - *DEI Not Displayed*
  - *Corrective Actions*
    - *Exceptions to Corrective Actions*
- *Mouse Controls*
- *Quality Check*
- *Print Images*
  - *Auto Print*
  - *Manual Print*
    - *Print Multiple Images*
    - *Print Current Image*
- *Send Images*
- *Save Changes to Images*

Overview

The left side of the screen contains all the image selection and adjustment tools. Most of the tools are categorized into 4 “palettes” that can be expanded or collapsed to reveal or hide different functions.

The majority of the screen is devoted to image display. The images on the right side of the screen update as adjustments are made. You are able to view single or multiple images at once. When viewing multiple images, as shown in Figure 9-1, an aqua border identifies the currently selected image.

Table 9-1 describes the functions for the Image Viewer screen.

Figure 9-1 Image Viewer screen

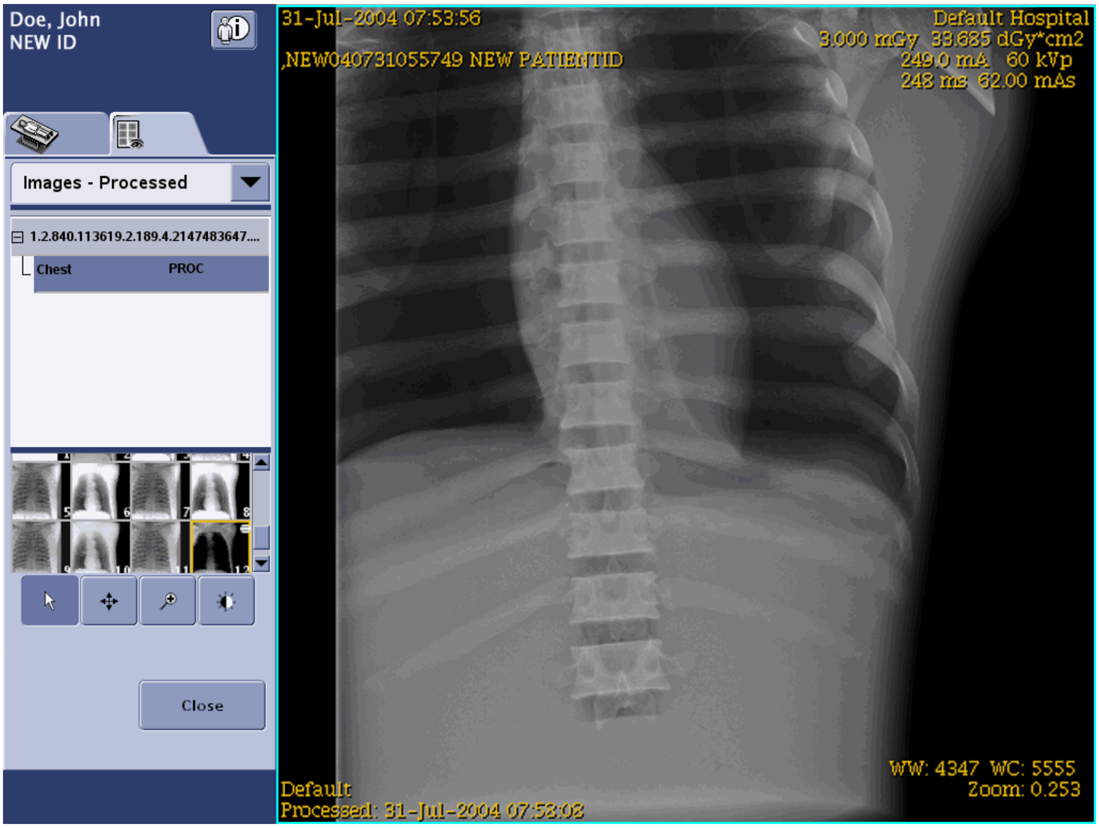
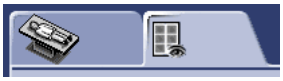
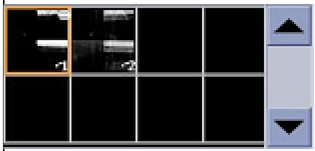
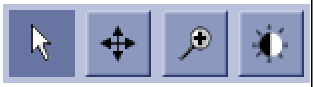
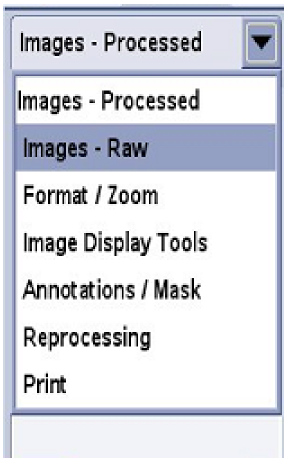
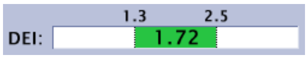

Doe, John
NEW ID
Images - Processed
1.2.840.113619.2.189.4.2147483647....
Chest
PROC
Close
31-Jul-2004 07:53:56
,NEW040731055749 NEW PATIENTID
Default Hospital
3.000 mGy 33.685 dGy*cm2
249.0 mA 60 kVp
248 ms 62.00 mAs
WW: 4347 WC: 5555
Zoom: 0.253
Default
Processed: 31-Jul-2004 07:53:08

Table 9-1 Image Viewer screen functions

Function	Description
Patient Identification Young, Frank NEW PATIENTID	Identifies the patient.
Patient Information	Displays Patient Information screen for the current patient. Refer to *Chapter 6: Worklist-Add Patient / Edit Patient Information* for more information. **NOTE:** Patient Information is only available during Image Acquisition on an open exam.

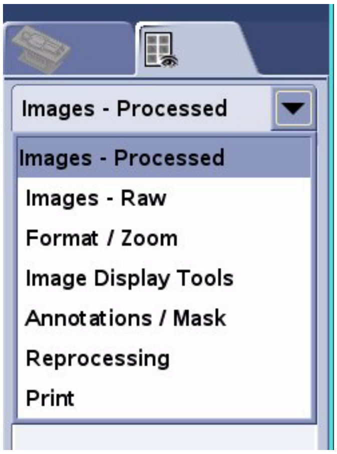
Function	Description
Screen Switch Tab 	If in an active exam, allows you to switch back to the Acquisition screen. If viewing images from a completed exam, the Acquisition screen tab is disabled. **WARNING: When acquiring multiple images or if you need to retake an image, you must switch back to the Acquisition screen in order to record the exposure. Making an exposure while the Viewer screen is displayed will expose the patient to radiation, but the detector will not acquire the image.**
Small Preview Image 	Collapsible pane that shows small previews of all images in the selected series and highlights the images currently shown in the viewer. Refer to *Select Images* for more information.
Mouse Controls 	Changes the action of the mouse when clicked and dragged on the image. Refer to *Mouse Controls* or more information.
[CLOSE] 	Closes the Image Viewer screen and prompts you to save any changes to images. Close also initiates auto print and auto push, if enabled. Refer to *Save Changes to Images* for more information.

Function	Description
Tool Selection List  Images - Processed Images - Processed Images - Raw Format / Zoom Image Display Tools Annotations / Mask Reprocessing Print	Switches between different tool panels to change the image display or manipulate the image. Tools are divided into four tabs, by category. • Image Display Tools – Including display Raw and Processed images, Image Dispaly Tools, Refer to *Adjust Images*. • Annotation – Refer to *Annotate Images*. • Image Processing – Refer to *Re-process Images* • Manually print - Refer to *Print Images*.
DEI (Dose Exposure Indicator)  1.3 2.5 DEI: 1.72	If enabled, displays the dose received by the detector and if the dose is within an acceptable range for the anatomy. You may need to re-take images that show doses above or below the acceptable range. Refer to *Dose Exposure Indicator (DEI) Function* for more information. **NOTE:** Depending on your system's configuration, the DEI may only show a numerical value.

Tool Selection List

Switches between different tool panels to change the image display or manipulate the image.

Figure 9-2 Tool Selection List

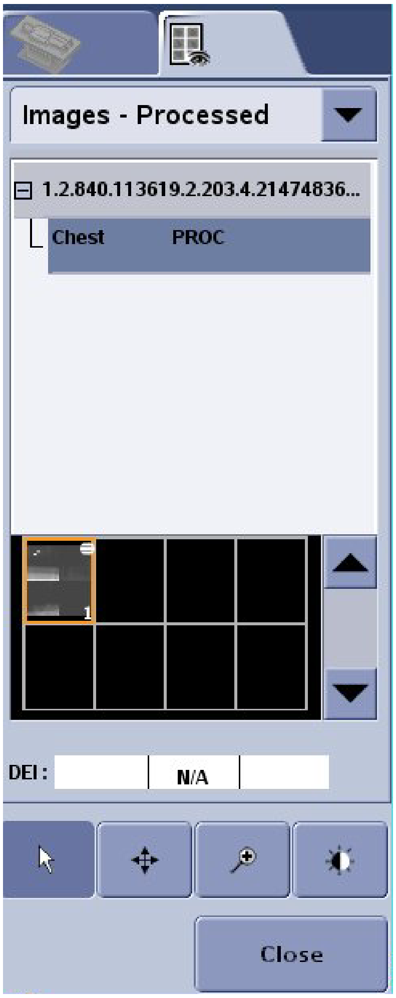

Images - Processed
Images - Processed
Images - Raw
Format / Zoom
Image Display Tools
Annotations / Mask
Reprocessing
Print

Select Images

The Images-Processed panel in the Image Tools palette (Figure 9-3) allows you to select which exam or series of images to view.

NOTE: When viewing or adjusting images from a completed exam, always work with processed images.

Figure 9-3 Images-Processed panel



The Images panel shows previews of all images in the selected series. The panel shows up to 8 image previews at a time. If there are more than 8 images in the series, a scrollbar appears on the right to allow you to see the rest of the images.

The image that is currently selected in the Image Viewer is shown with an orange border in the Images panel.

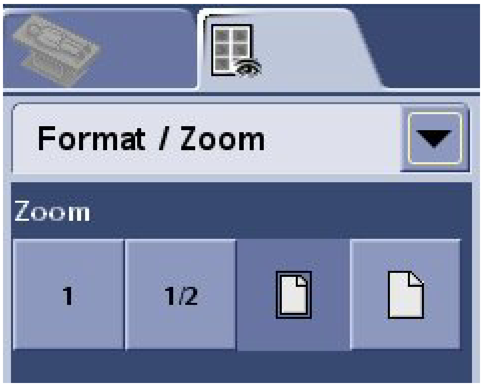
To view an image, click an image preview.

Change Viewing Format and Size

The Format/Zoom panel in the Image Tools palette controls how many images appear in the Image Viewer screen at one time and adjust the magnification of each image.

The Display Format panel (Figure 9-4) allows you to view up to 9 images at one time.

Figure 9-4 Format/Zoom panel – Display Format pane



The Zoom panel (Figure 9-5) changes the size of the selected image as shown in the Viewer. Table 9-2 describes the Zoom options.

Figure 9-5 Format/Zoom panel – Zoom panel

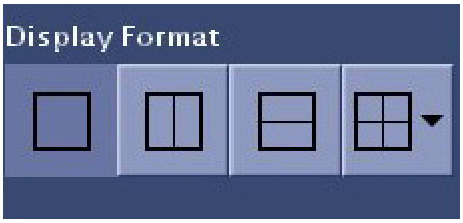


Table 9-2 Format/Zoom panel – Zoom pane descriptions

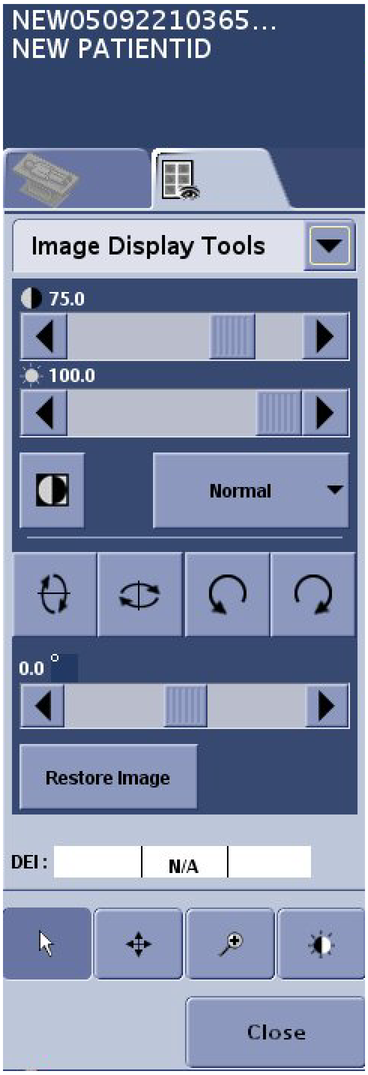
Tool	Description
1:1 Display **1**	Shows default the image size where one pixel on the detector equals one pixel on the screen.
Zoom Half **1/2**	Reduces the image to 50% (four pixels on the detector equals one pixel on screen).

Tool	Description
Fit To Screen 🗋	Scales the image to fit within the Image Viewer screen.
True Size 🗋	Shows the image in the exact size it was acquired from the detector (one centimeter on the detector equals one centimeter on screen).

Adjust Images

The Image Display Tools panel in the Image Tools palette (Figure 9-6) contains the tools to flip, rotate, adjust brightness, adjust contrast, invert, and apply windowing to images. Table 9-3 describes each tool and how it functions.

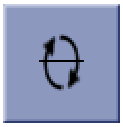
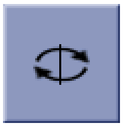
Figure 9-6 Image T Display Tools panel

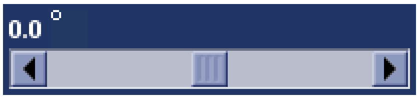
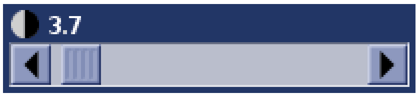
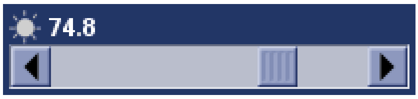


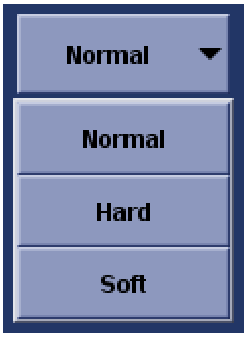
NEW05092210365...
NEW PATIENTID

Image Display Tools
75.0
100.0
Normal
0.0 °
Restore Image
DEI : N/A
Close

Table 9-3 Image Tools panel – Windowing and Geometric Operations tools description

Tool	Description
Vertical Flip 	Flips the selected image 180 degrees on the horizontal axis; that is, switches top for bottom.
Horizontal Flip 	Flips the selected image 180 degrees on the vertical axis; that is, switches left for right.

Tool	Description
Rotate Left	Rotates the selected image counter-clockwise in 90 degree increments.
Rotate Right	Rotates the selected image clockwise in 90 degree increments.
Free Rotation 	Rotates the selected image both clockwise and counter-clockwise. • Click the end buttons to rotate the image in 0.1 degree increments. • Click and drag the slider to spin the image. • Move the slider right to rotate the image clockwise. • Move the slider left to rotate the image counter-clockwise.
Contrast 	Adjusts the differences between dark and light on the selected image. • Move the slider right for more contrast (towards pure black and white). • Move the slider left for less contrast (towards uniform gray).
Brightness 	Lightens or darkens the selected image. • Move the slider right for a lighter image. • Move the slider left for a darker image.
Invert	Reverses light and dark areas of the selected image.

<table>
<tr><th>Tool</th><th>Description</th></tr>
<tr><td>Windowing

</td><td>Applies windowing to the selected image.
Available options are:
• Normal – image as acquired
• Hard – adjusts the image towards black and white
• Soft – adjusts the image towards gray</td></tr>
<tr><td>Restore Image

Restore Image

</td><td>Removes all adjustments and returns the selected image to its original state.</td></tr>
</table>

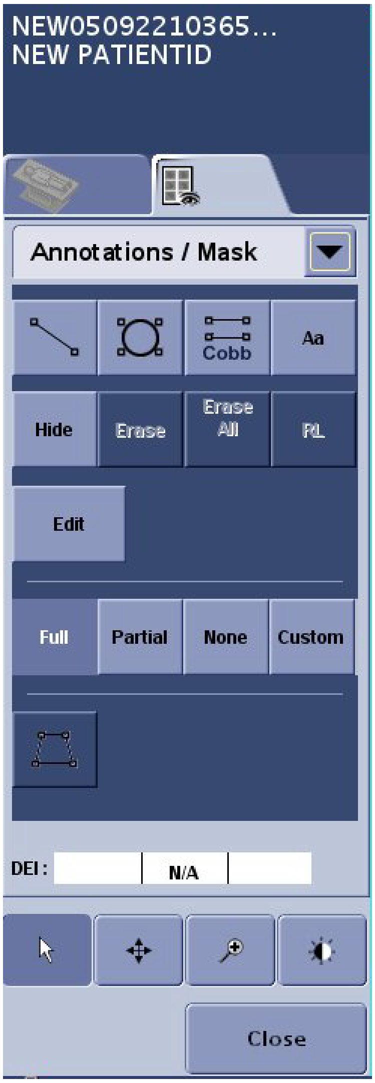
Annotate Images

The Annotation panel (Figure 9-7) contains the tools to annotate images. Table 9-4 describes the tools and their functions.

Image annotations are divided into two categories:

- System annotation – Information that is kept by the system, such as identifying information, exposure and acquisition information, and processing information. These annotations are displayed as text at the corners of the image. You may select which annotations appear, but you cannot control where the annotations are placed.
- Image annotation – Lines, ellipses, Cobb angle, user annotation (notes), and RL markers added by the operator to measure or bring attention to a section of the image. You draw or place these annotations on the image as appropriate.

Figure 9-7 Image Tools palette – Annotation panel



NEW05092210365...
NEW PATIENTID
Annotations / Mask
Cobb
Aa
Hide
Erase
Erase All
RL
Edit
Full
Partial
None
Custom
DEI :
N/A
Close

Table 9-4 Image Tools palette – Annotations panel tool descriptions

Tool	Description
Full **Full**	Places all available system annotation on the image. • Patient information – (top left corner) exam date and patient identification • Study information – (top left corner) exam identification • Series information – (top left corner) series identification • Image information – (top left corner) image identification • Acquisition information – (top right corner) dose and DAP • Hospital information – (top right corner) the name of the facility where the image was acquired • X-ray parameters – (top right corner) the mA, kVp, ms, and mAs of the exposure • Anatomy information – (bottom left corner) the protocol used to acquire the image • Processing information – (bottom left corner) the look used to process the image • User measurements – (bottom right corner) size and angle measurements for line, ellipse, and Cobb annotations • Display parameters – (bottom right corner) the size of the image and the zoom
Partial **Partial**	Displays ONLY the facility name, dose information and technical factors.
None **None**	Removes all system annotations from the image. System annotations can be re-applied by clicking [FULL], [PARTIAL], or [CUSTOM].
Custom **Custom**	Brings up a screen (Figure 9-8) that allows you to choose which system annotations appear. Refer to *Customize Annotations* for more information.
Line	Places a line on the image that you may re-size, move, or angle. Line specifications are shown in the User Measurements annotation at the bottom right corner of the viewer. Refer to *Add Image Annotations* for more information.

Tool	Description
Ellipse	Places an ellipse (circle or oval) on the image that you may re-size, move, or re-shape. Ellipse specifications are shown in the User Measurements annotation at the bottom right corner of the viewer. Refer to *Add Image Annotations* for more information.
Cobb Cobb	Places a Cobb angle (two lines) on the image that you may re-size, move, or angle. Cobb angle specifications are shown in the User Measurements annotation at the bottom right corner of the viewer. Refer to *Add Image Annotations* for more information.
User Annotation Aa	Places a text box on the image that you may add notes into. Refer to *Add Image Annotations* for more information.
Hide and Show Hide	Temporarily removes image annotations from the image. Click [SHOW] to see the annotations.
Erase Erase	Deletes the selected image annotation. **NOTE: Deleted annotations cannot be recovered.**
Erase All Erase All	Deletes all image annotations. **NOTE: Deleted annotations cannot be recovered.**
RL RL	Places a Right or Left marker on the image for reference. **NOTE: RL markers are only available when the image is open in a live exam.** Refer to *Add Image Annotations* for more information.
Manual Shutter	Applies shutters manually to crop the image. **NOTE: This function is only available when the image is open in a live exam.** Refer to *Add Image Annotations* for more information.

Customize Annotations

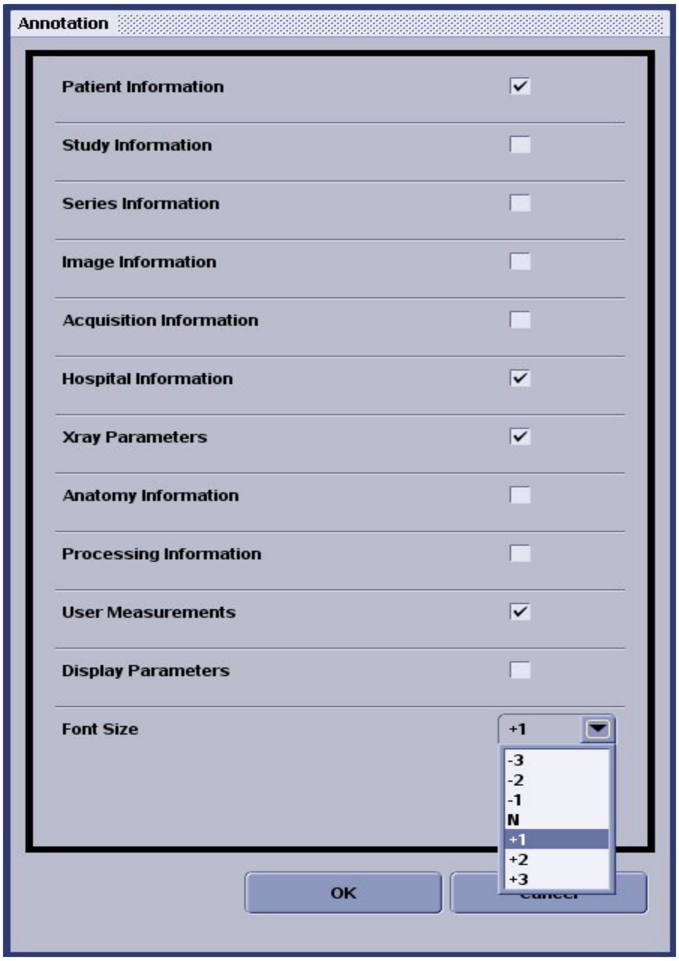
Follow this process to customize the system annotations that appear on the image.

1. Open the Image Tools palette and click the Annotations tab, if necessary.
2. Click [CUSTOM].
    - The Annotation screen (Figure 9-8) appears.
3. Select (check) the annotations you want to appear.
4. Adjust the Font Size, if necessary.
    - The available font sizes are:

-3	Smallest
-2	
-1	
N	Normal
+1	
+2	
+3	Largest

5. Click [OK].
    - [CANCEL] closes the screen and leaves the selections unchanged.

Figure 9-8 Custom Annotation selections



Annotation

Patient Information ☑

Study Information ☐

Series Information ☐

Image Information ☐

Acquisition Information ☐

Hospital Information ☑

Xray Parameters ☑

Anatomy Information ☐

Processing Information ☐

User Measurements ☑

Display Parameters ☐

Font Size +1

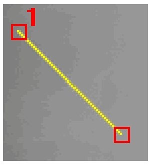
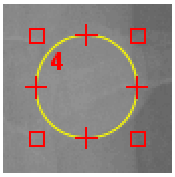
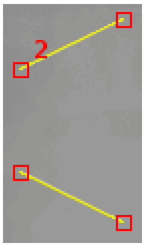
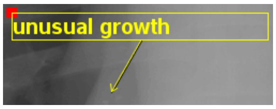
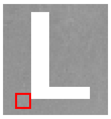
Add Image Annotations

NOTE: All image annotations appear in the same place (center of image) and are the same shape, size, and/or angle. It is possible to have multiple annotations of the same kind stacked on top of each other.

Follow this process to add user annotations.

1. Select the image to annotate, if necessary.
2. Click the button of the annotation to insert.
3. Move, re-size, or change the angle of the annotation as described in Table 9-5.

Table 9-5 Image annotation instructions

Tool	Instructions
Line  	Select the line. • To move: Click and drag the middle of the line. • To change the angle: Click and drag one of the square handles at the ends of the line. • To resize: Click and drag one of the square handles at the ends of the line.
Ellipse  	Select the ellipse. • To move: Click and drag the ellipse by its edge (not on a square handle or + handle). • To change shape or re-size: Click and drag a square handle. • To rotate: Click and drag a + handle.
Cobb  	Select the Cobb. • To move: Click and drag the middle of the line. • To change the angle: Click and drag one of the square handles at the ends of the line. • To resize: Click and drag one of the square handles at the ends of the line.
User Annotation  	Select User Annotation from the Image Tools palette. Click in the "CUSTOM" text area. Type your comment. Click [OK]. • To move: Click and drag by the red square on the top left corner of the text box. • To edit: Double-click on the text. Make changes. Click OK.
RL Marker  	Select the RL marker. • To move: Select the Marker and drag to the desired area. • To switch between R and L: Click the [RL] button. **NOTE:** **Only one RL marker is inserted per image.**

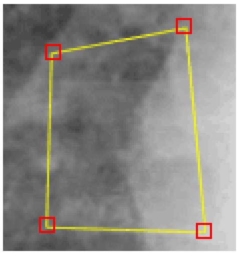
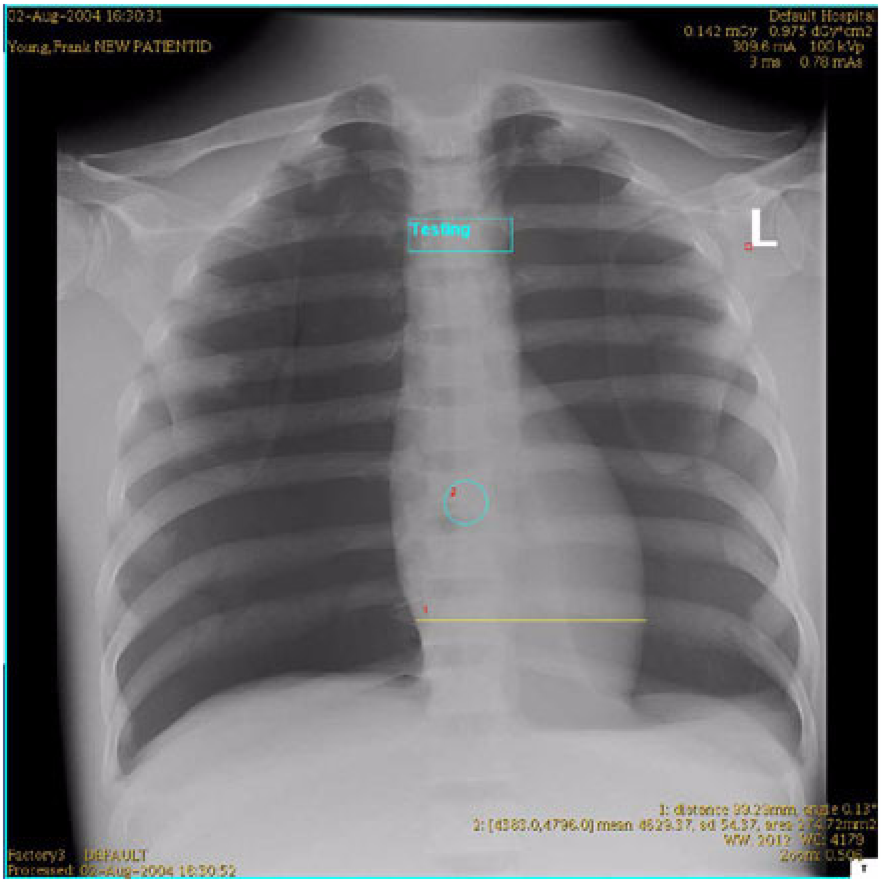
Tool	Instructions
Manual Shutter 	Select the Manual Shutter. Click and drag the red corner handles to the desired shape and size. Click [MANUAL SHUTTER] to apply. Click [MANUAL SHUTTER] again to remove.

Figure 9-9 Example of image annotations


02-Aug-2004 16:30:31
Young, Frank NEW PATIENTID
Default Hospital
0.142 mGy 0.975 dGy*cm2
309.6 mA 100 kVp
3 ms 0.78 mAs
Testing
L
1
2
1: distance 99.29mm, angle 0.13°
2: [4383.0,4796.0] mean 4629.37, sd 54.37
WW: 2012 WC: 4179
Zoom: 0.506
Factory3 DEFAULT
Processed: 02-Aug-2004 16:30:52

Yellow = selected annotation

Aqua = unselected annotation

Delete Image Annotations

Follow this process to remove image annotations.

NOTE: It is not possible to recover deleted annotations.

1. Select the annotation.
2. Click [ERASE] or [ERASE ALL].
   - If [ERASE ALL] was clicked, a message appears: "Would you like to remove all annotations from the selected image?"
3. Click [YES].
   - All annotations are removed.

Re-process Images

Image re-processing allows to extract more information from an already acquired image by changing the processing settings instead of taking additional exposures.

Re-processing can be performed on any image that has a corresponding raw data set. Images can be reprocessed both in live exams and in review mode.

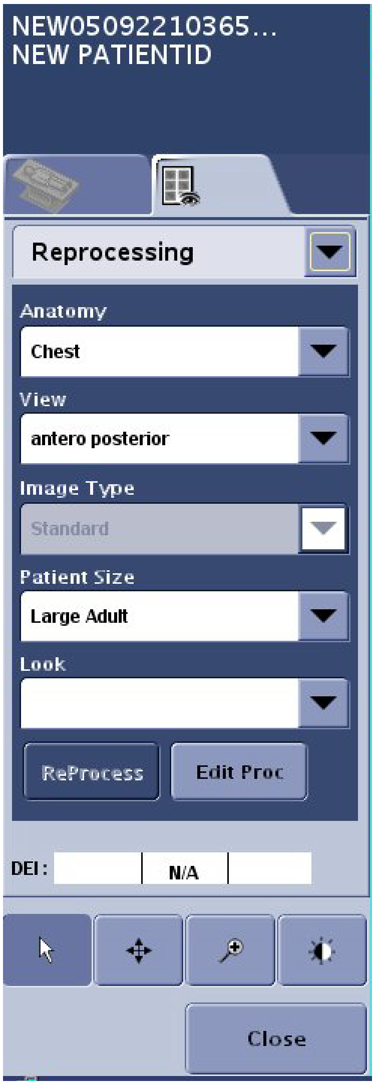
When in an active exam, re-processing will create a new "PROCESSED" series. When in review mode, re-processing will create a new image (or multiple images if Dual Energy) in the series.

NOTE: When closing an exam or closing patient in review mode, the you must select to save changes to images or the re-processed images will not remain in the series. Refer to *Save Changes to Images* for more information.

The initial image processing is determined by the default that is configured for the protocol. Refer to *Chapter 15: Set Preferences - Image Processing* for more information.

Table 9-6 describes the settings used to re-process an image.

Figure 9-10 Image Tools palette – Image Re-Processing panel



NEW05092210365...
NEW PATIENTID

Reprocessing

Anatomy: Chest
View: antero posterior
Image Type: Standard
Patient Size: Large Adult
Look:

DEI : N/A

Table 9-6 Image Tools palette – Image Processing panel descriptions

Function	Description
Current	Shows the current image processing settings.
Anatomy	Changes the anatomical region.
View	Changes the view.
Image Type	Changes the image type. Available options are: • Standard

Function	Description
Patient size	Changes the patient size.
Look	Changes the processing look. Looks are the way an image is processed to be viewed by a radiologist for interpretation. Looks are pre-defined combinations of brightness, contrast, edge enhancement, and tissue equalization. Factory Look descriptions: • Factory Look 1 – accommodates Chinese doctors' preference • Factory Look 2 – low CR look, low edge, moderate tissue contrast • Factory Look 3 – moderate CR look, low edge, TE • Factory Look 4 – highly digital look, high edge, high TE • Custom looks – The system allows the user to build up to 5 custom looks in any combination of parameters. Refer to *Chapter 15: Set Preferences - Image Processing* for more information on building custom looks.
[REPROCESS] 	Applies the changes and re-processes the image. **NOTE: When in an active exam, re-processing will create a new "PROCESSED" series.** When in review mode, re-processing will create a new image in the series.
[EDIT PROC] 	Brings up a screen that allows you to view the Factory look settings or create custom looks. Refer to *Chapter 15: Set Preferences - Image Processing* for more information on building custom looks.

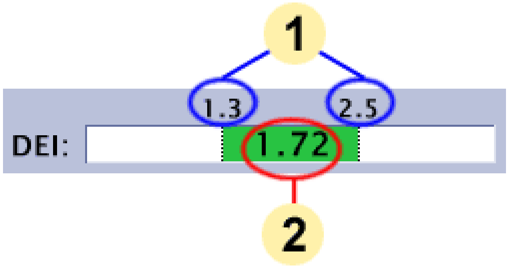
Dose Exposure Indicator (DEI) Function

The Dose Exposure Indicator (DEI) provides a visual indicator to the user for the amount of exposure received by the detector for a given image. It is designed as a tool for the user to be able to alter acquisition parameters in the event of a retake. DEI measures the dose that has reached the detector and compares it to the expected dose for the anatomy to indicate if the image is under- or over-exposed.

With film cassettes, exposure is directly related to the resulting image; films that are under-exposed or over-exposed will be either too light or too dark. With the GE Portable DR Detector, dynamic range detection algorithms compensate for exposure errors to create images with acceptable brightness and contrast. Because there is no visible relationship between the actual exposure and the image quality, DEI identifies and tracks under- and over-exposure.

The DEI acceptable range varies by anatomy. For example, a chest PA exposure may result in a DEI of 0.6 while a hand exposure may result in a DEI value of 1.0. The upper and lower DEI limits can be adjusted for each anatomical view through the Preferences screen.

Figure 9-11 DEI visual range display



1. Acceptable DEI range (upper and lower limit)
2. Current DEI for the selected image

Figure 9-12 Example of a numerical DEI display

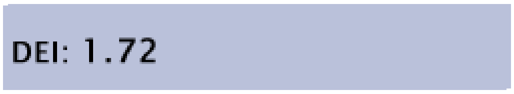
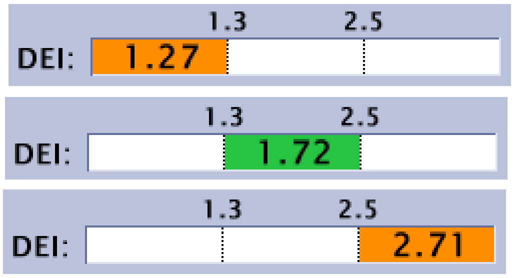

DEI: 1.72

Figure 9-13 Examples of visual range DEI displays



Low DEI = Image under-exposed

Acceptable DEI = Image correctly exposed

High DEI = Image over-exposed

For each acquired image, the Detector Exposure Indicator provides 3 estimated values:

- Uncompensated Detector Exposure (UDExp): Estimated exposure (μGy) to the detector behind the patient anatomy with an assumed a technique of 80 kV with no anti-scatter grid. This information is stored in the DICOM header.
- Compensated Detector Exposure (CDExp): Estimated exposure (μGy) to the detector behind the patient anatomy with the actual kV and use of anti-scatter grid. This information is stored in the DICOM header.
- Detector Exposure Index (DEI): A relative measure of exposure to the detector, as compared to the expected exposure for a particular anatomical view. It is a visual indicator on the viewer display.

DEI compensates for the speed setting of the system. For example, if an exposure is taken of an object at a speed setting of 400 and the resultant DEI was 1.72, then an exposure taken of the same object (assuming identical technique and positioning) after setting the speed to 200 will also give a DEI of 1.72.

NOTE: A higher DEI indicates a higher exposure to the detector. It should not be confused with system "speed" which decreases as the exposure increases.

Default DEI lower and upper limits are provided as preliminary guidelines. These guidelines should not be taken as strict requirements of retakes/re-exposures. DEI read-outs are reference guides to help the technologist determine that if a re-acquisition of an image is necessary, the indicator can help the user determine appropriate technique adjustments to provide adequate exposure to the detector.

The specific limits and retake rules should be ultimately determined by the appropriate staff at your facility.

DEI Not Displayed

The DEI will not be displayed in the following situations:

- A complete exam is opened in "Image Management" screen.
- Re-processed images.
- Dual Energy images (if DE is enabled).

Corrective Actions

Do the following if **both** the DEI indicator is out of the acceptable range and the image quality is poor:

- Low DEI - increase the mAs and kV values.
- High DEI - decrease the mAs and kV values.

If DEI is within the acceptable range but the image quality is still poor, the image may need adjustment through looks customization. Refer to *Re-process Images* to correct individual images or *Chapter 15: Set Preferences - Image Processing* to change the default processing for exams and views.

NOTE: Call for service if the system continues to show low or high DEI. Recurring DEI errors may indicate that the system needs calibration or repair.

Exceptions to Corrective Actions

The following conditions may achieve a properly exposed image but still result in a low DEI. These should be treated as special cases and the standard retake and corrective action rules may not apply.

- The presence of external patient shielding (i.e., lead apron) in the field of view can result in an unexpectedly low DEI (and UDExp/CDExp). The presence of shielding can be easily confirmed by viewing the image.

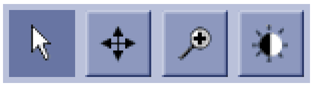
- The incorrect determination of the FOV by the system can result in an unexpectedly low DEI (and UDExp/CDExp). The presence of significant collimation regions in the final image can be easily confirmed by viewing the image. Correct the FOV using the Manual Shutter and re-process the image to get a better DEI estimate.

NOTE: User must select the appropriate FOV for the anatomy imaged, and use proper collimation at all times.

Mouse Controls

The mouse control buttons (Figure 9-14) changes the action of the mouse when it is clicked and dragged on an image.

Figure 9-14 Mouse control buttons



The mouse controls allow you to perform other functions that are not available in any other tool palette.

Follow this process to change the mouse controls. Table 9-7 describes the action of each control.

1. Select the image to act upon, if necessary.
2. Click the mouse control to use.
3. Click and drag the mouse on the selected image.

Table 9-7 Mouse Control description

Tool	Description
Select Image ↖	When viewing multiple images, selects the image to act upon. This is the default mouse behavior.
Pan Image ✥	Moves the image within the viewing area.
Image Magnifying Glass 🔍	Shows a small part of the image at 3 times magnification.

Tool	Description
Change Image Brightness / Contrast	Changes the brightness and contrast by dragging the mouse pointer instead of using the Image Tools controls. • Contrast: Click and drag the mouse vertically. Up is more contrast, down is less contrast. • Brightness: Click and drag the mouse horizontally. Right is brighter, left is darker.

Quality Check

If Auto Tag is enabled (refer to *Chapter 15: Set Preferences - Image Management* for more information), quality check indicates that an image is of acceptable quality and allows the image to be auto-printed and auto-pushed (if enabled).

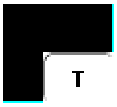
The quality check indicator is a "T" that appears in a white box at the bottom right corner of the image (Figure 9-15). The quality check indicator is on by default. Removing the indicator means that the image is not acceptable and will not be auto printed or auto sent and will remain on the local database only.

NOTE: The quality check indicator is only available in live exams.

To remove the quality check indicator, double-click the white box so that the "T" disappears.

To restore the quality check indicator, double-click the white box so that the "T" reappears.

Figure 9-15 Quality check indicator



Print Images

Images can be printed from the system in 2 ways: Manual Print and Auto Print.

Auto Print

The system can be configured to perform an automatic print upon closure of the exam. Preferences are accessed from the Utilities screen. Refer to *Chapter 15: Set Preferences - Image Management* for information on configuring Auto Print.

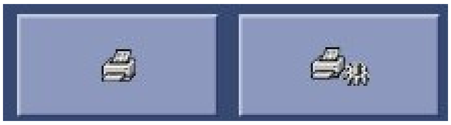
Manual Print

Film Manager and Manual Print allow you to print images on demand.

- Film Manager allows configuration and printing of multiple images in a series.
- Manual Print allows configuration and printing of the currently selected image.

The manual print buttons are near the bottom of the tools area, under the mouse controls buttons, as shown in Figure 9-16.

Figure 9-16 Manual print buttons – Film Manager and Manual Print

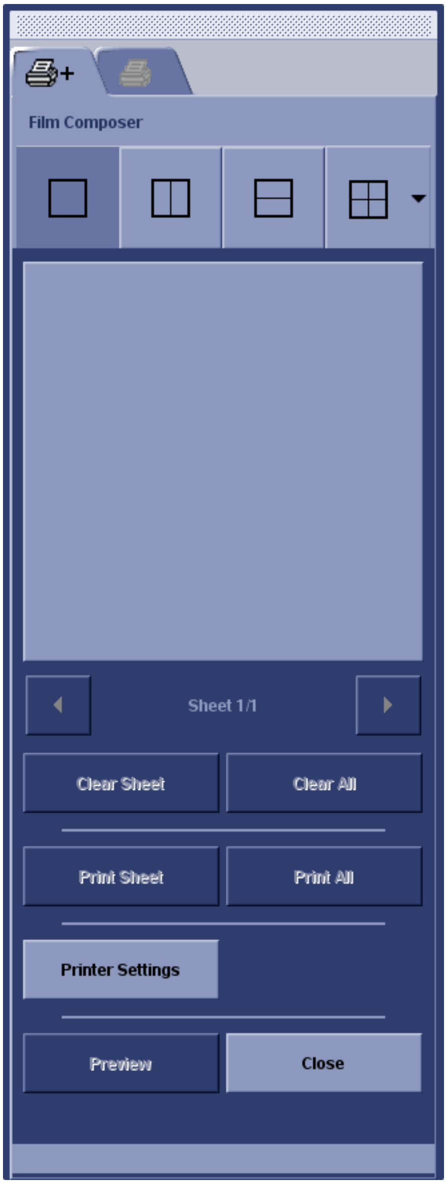


Print Multiple Images

Follow this process to print multiple images.

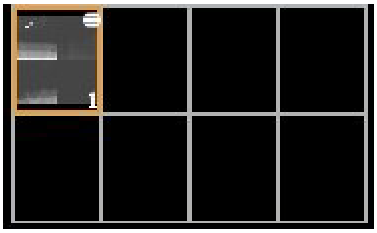
1. Click [FILM MANGER].
   - The Film Composer screen (Figure 9-17) appears.

Figure 9-17 Film Composer screen


Film Composer
Sheet 1/1
Clear Sheet
Clear All
Print Sheet
Print All
Printer Settings
Preview
Close

2. Select the number of images you want to appear on a sheet.
   - If there are more images in the series than will fit on the sheet, use the Sheet [◂] and [▸] buttons to configure the printing options for each sheet.
3. Use the mouse to click and drag the image thumbnails from the Images palette (Figure 9-18) to the Film Composer screen.

Figure 9-18 Images pane



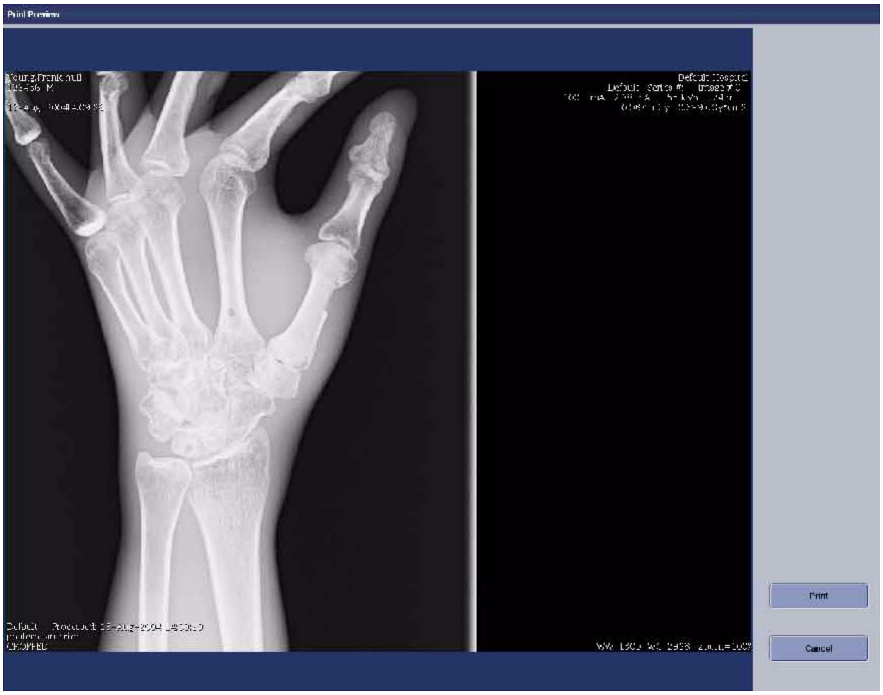
4. Use the buttons to confirm and adjust the print settings.
   - Click [PREVIEW] to see how the images are positioned on the sheet.
   - Click [CLEAR SHEET] to remove images from the currently displayed sheet.
   - Click [CLEAR ALL] to remove images from all sheets.
   - Click [PRINT SHEET] to print the currently displayed sheet.
   - Click [PRINT ALL] to print all sheets.
5. Click [PRINTER SETTINGS] to confirm or adjust the printer configuration. (Refer to Figure 9-20 and Table 9-8 for more information.)
6. Click [CLOSE] when finished.

Print Current Image

Follow this process to print a single image.

1. Select the image from the Images tool palette, if necessary.
2. Click [MANUAL PRINT].
   - The Print Images screen appears.
3. Adjust the settings as indicated in Table 9-8.
4. Click [PREVIEW] to confirm that the image placement is correct.
   - If the image placement is incorrect (as shown in Figure 9-19), click [CANCEL] to return to the Print Images screen and adjust the settings.
   - If the image placement is acceptable, click [PRINT] to print the image.

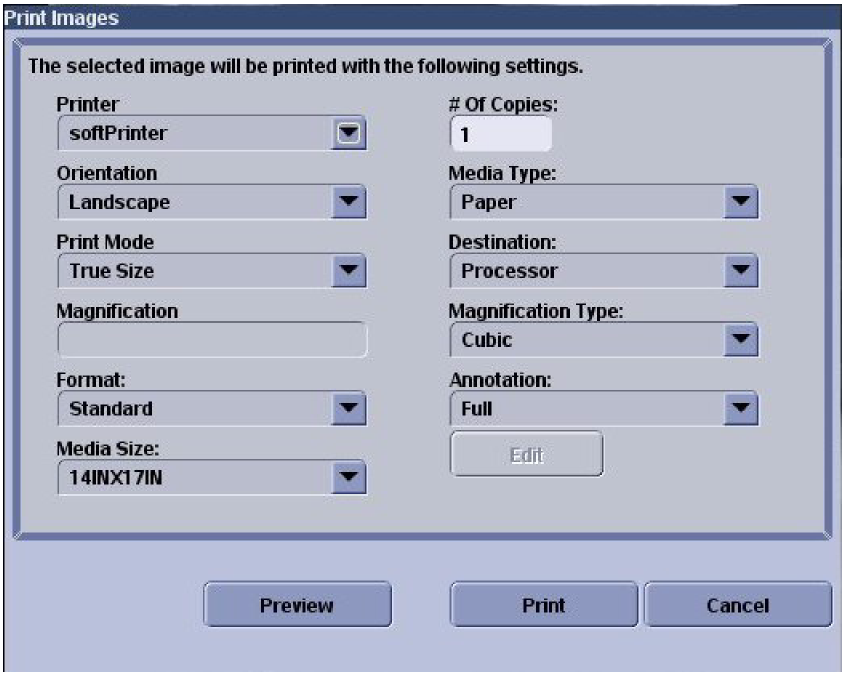
Figure 9-19 Example of Print Preview with incorrect settings


Print Preview
Print
Cancel

5. Click [PRINT] to print the image.

   - [CANCEL] closes the Print Images screen without printing and returns you to the Image Viewer screen.

Figure 9-20 Print Images screen


Print Images
Edit
Preview
Print
Cancel

The selected image will be printed with the following settings.

Printer: softPrinter
Orientation: Landscape
Print Mode: True Size
Magnification:
Format: Standard
Media Size: 14INX17IN
Of Copies: 1
Media Type: Paper
Destination: Processor
Magnification Type: Cubic
Annotation: Full

Table 9-8 Print Images field description

Field	Description
Printer	Lists all available printers configured for your system.
Orientation	Selects vertical or horizontal orientation of the image on film or paper. Available options are: • Landscape • Portrait
Print Mode	Selects what size to print the image. Available options are: • True Size • Fit to Film • Reduced Size
Magnification	Only available if Reduced Size is selected for the Print Mode.
Format	Selects the print format. Available options are: • Standard • 35 mm • 40 mm
Media Size	Shows the available sizes that are configured for the selected printer.
# of Copies	Defines how many copies to print.
Media Type	Selects the type of media to print on. Available options are: • Paper • Clear film • Blue film
Destination	Shows configured printers on the system.
Magnification Type	Selects the magnification type. Available options are: • Cubic • None

Field	Description
Annotation	Selects the amount of annotation to print on the image. Available options are: • Full • Partial • Custom • None Refer to *Annotate Images* for more information.
[EDIT]	If Custom Annotation was selected, brings up a screen that allows you to choose the annotation to print on the image. Refer to *Annotate Images* for more information.
[PREVIEW]	Shows how the image will appear on the film or paper with the current settings.
[PRINT]	Prints the image.
[CANCEL]	Cancels printing.

Send Images

If Auto Send is enabled, acquired images are automatically sent to a pre-determined location on exam close. Refer to *Chapter 15: Set Preferences* for information on configuring Auto Send.

Save Changes to Images

You have the option to save or discard the changes you have made to images when you close the Image Viewer screen or end the exam.

1. If in a live exam, click [CLOSE] on the Acquisition screen.
2. If in review mode, click [CLOSE] on the Image Viewer screen.
   - A message appears: "Would you like to save the changes made to the images?"
3. Click [YES].
   - [CANCEL] closes the screen and returns you to the Image Viewer screen.
   - [NO] closes the Image Viewer screen without saving changes.

NOTE: New images will not be generated when adding annotations.

Chapter 10

Exposure Control

Topics covered include:

- *Automatic Exposure Control (AEC)*
  - *Console Screens*
  - *Ion Chamber Detectors*
  - *Applications for Detector Sensing Areas*
  - *AEC Limitation Messages*
  - *Acquire AEC Images*
- *Manual Exposure Mode*
  - *Method*

Automatic Exposure Control (AEC)

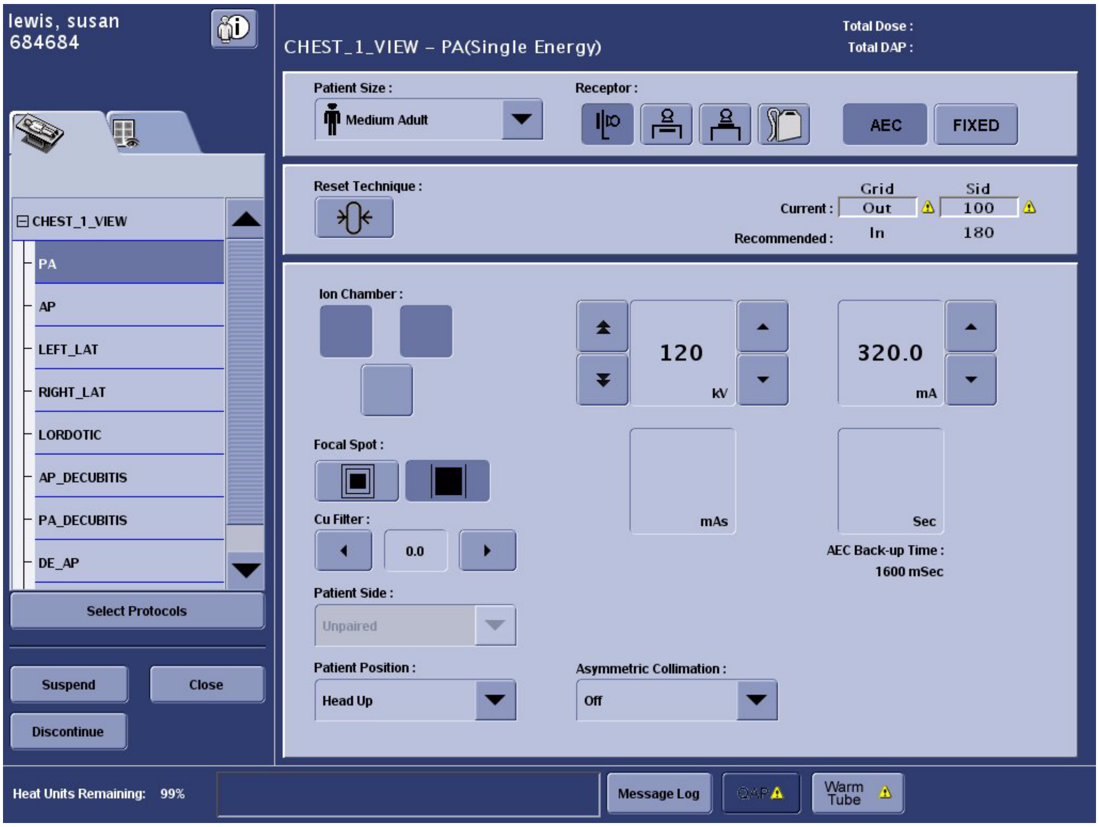
The Automatic Exposure Control automatically terminates an X-ray exposure to produce optimum quality images. AEC automatically compensates for changes in patient thickness, opacity, and different technique factors of mA, kVp, and SID. Proper patient positioning is very important. In extreme cases of misalignment, some radiation bypasses the patient and ends the exposure prematurely, causing underexposed images. Conversely, positioning the heaviest patient area over the detector sensing area may cause overexposed image areas. You should become familiar with the size and location of each detector. With such knowledge, you can develop proper positioning techniques of each anatomical area and be able to duplicate your positioning for every patient. This also helps you produce uniform quality images regardless of patient thickness or opacity. This system feature, AEC, automatically selects the mAs and exposure time, eliminating the need for you to select them.

Many default techniques are AEC based in order to optimize image processing. The exposure time and mAs are automatically selected when you are in AEC mode, producing uniform quality images.

Console Screens

Figure 10-1 shows an example of an AEC exposure setup. For AEC mode, exposure time and mAs are not selectable; therefore, these parameters are empty on the Acquisition screen. This example provides an example an AEC exposure with Chest PA selected.

Figure 10-1 Example AEC setup of a normal chest exposure



lewis, susan
684684

CHEST_1_VIEW – PA(Single Energy)

Total Dose :
Total DAP :

Patient Size : Medium Adult

Grid — Current : Out; Recommended : In

Sid — Current : 100; Recommended : 180

120 kV

320.0 mA

Cu Filter : 0.0

AEC Back-up Time : 1600 mSec

Patient Side : Unpaired

Patient Position : Head Up

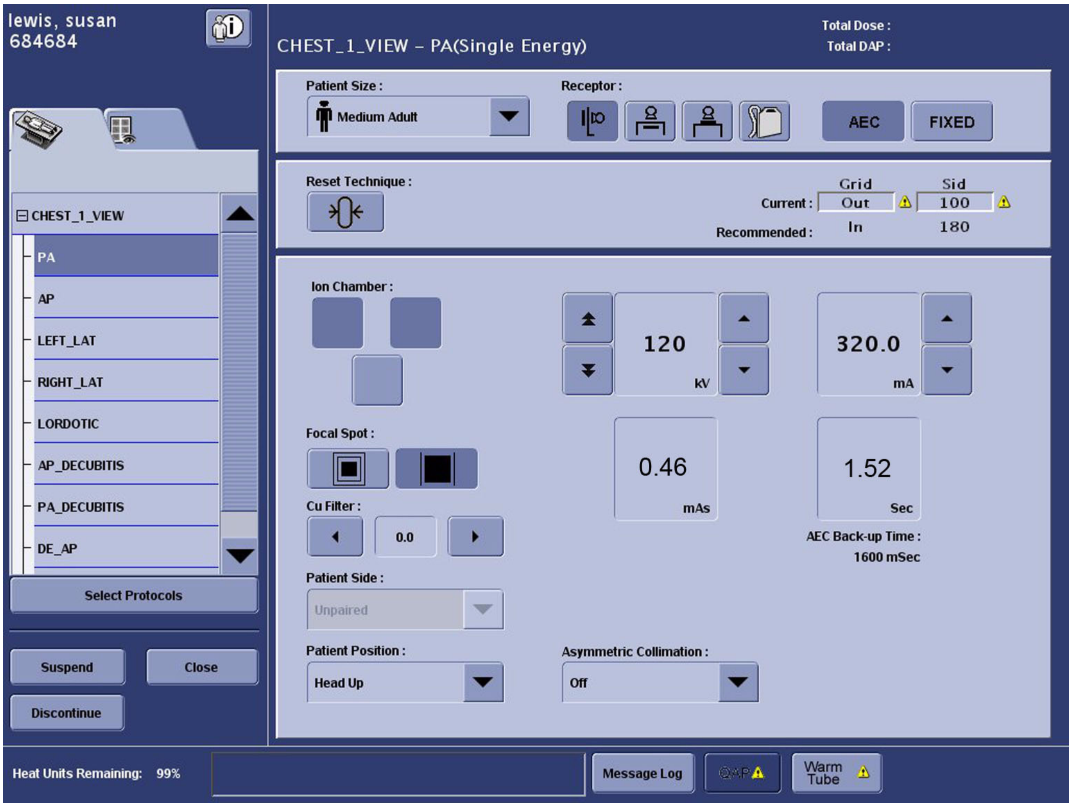
Asymmetric Collimation : Off

Heat Units Remaining: 99%

CHEST_1_VIEW
PA
AP
LEFT_LAT
RIGHT_LAT
LORDOTIC
AP_DECUBITIS
PA_DECUBITIS
DE_AP
Select Protocols
Suspend
Close
Discontinue
Receptor :
AEC
FIXED
Reset Technique :
Ion Chamber :
Focal Spot :
mAs
Sec
Message Log
QAP
Warm Tube

After the exposure has been completed in the AEC mode, the console automatically displays the exposure time and mAs values (Figure 10-2).

Figure 10-2 Example AEC exposure completed (normal operation)



lewis, susan
684684

CHEST_1_VIEW – PA(Single Energy)

Total Dose :
Total DAP :

Patient Size : Medium Adult

Receptor : AEC

Reset Technique :

Current : Grid Out, Sid 100
Recommended : Grid In, Sid 180

120 kV
320.0 mA
0.46 mAs
1.52 Sec

AEC Back-up Time : 1600 mSec

Cu Filter : 0.0

Patient Side : Unpaired

Patient Position : Head Up

Asymmetric Collimation : Off

Heat Units Remaining: 99%

CHEST_1_VIEW
PA
AP
LEFT_LAT
RIGHT_LAT
LORDOTIC
AP_DECUBITIS
PA_DECUBITIS
DE_AP
Select Protocols
Suspend
Close
Discontinue
AEC
FIXED
Ion Chamber :
Focal Spot :
Message Log
QAP
Warm Tube

The Applications software sets two limits for AEC operation: 512 is the maximum mAs. 2 seconds (2000 milliseconds) is the maximum exposure time.

NOTE: When either one of the above limits is reached, the Applications software terminates the exposure. For example, Equation 10-1 demonstrates that with a console selection of 250 mA, the system reaches the 2000 millisecond maximum exposure limit before it would reach the 512 mAs limit.

Equation 10-1 AEC exposure limit calculation

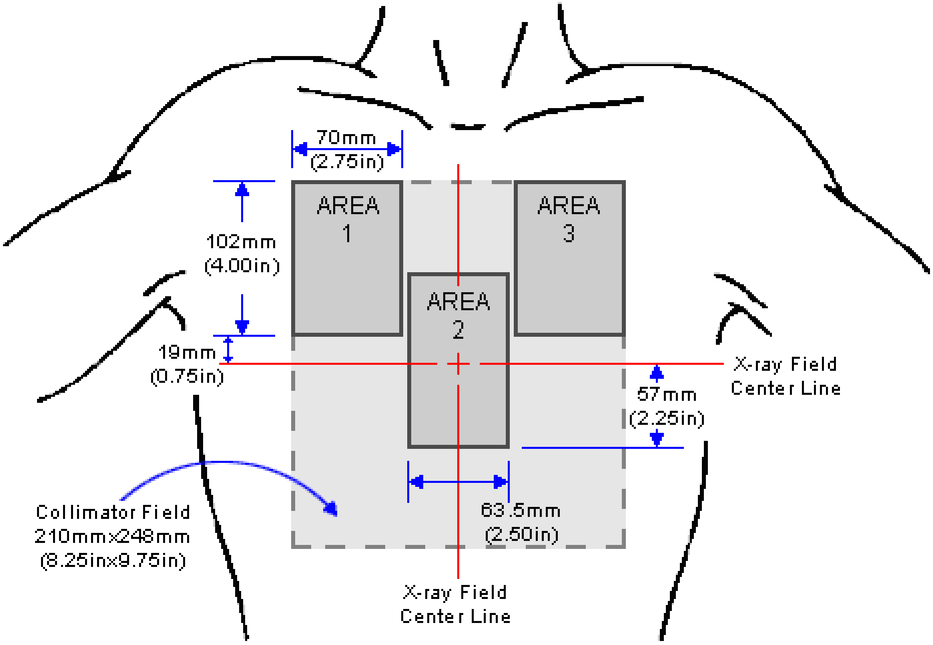
(the 250 mA console selection) X (2000 milliseconds) = 500 mAs

NOTE: The Applications software also uses a built-in formula to set limits for AEC operation in addition to the two limits stated above. This formula limits mAs to a value less than 512 mAs and exposure time to a value less than 2000 msec, depending upon the technique selected. Due to these limitations, you may reach an AEC limit even with a mAs value less than 512 mAs and with an exposure time less than 2000 msec. If either of these events occur, the Applications software terminates the exposure.

Ion Chamber Detectors

Ion Chamber Detectors have three sensing areas (Figure 10-3). Sensing Area 2 is located at the center of the X-ray beam. While Area 1 and Area 3 can be selected to cover an exposure of two symmetrical parts of the body, such as the lungs or the kidneys, care should be taken to center the patient and detector areas accordingly.

Figure 10-3 Sensing areas


70mm
(2.75in)
AREA 1
AREA 3
102mm
(4.00in)
AREA 2
19mm
(0.75in)
X-ray Field
Center Line
57mm
(2.25in)
Collimator Field
210mmx248mm
(8.25inx9.75in)
63.5mm
(2.50in)
X-ray Field
Center Line

The position of the sensing areas are shown in relation to the area of a 210 mm x 248 mm (8.25in x 9.75in) Collimator Light Field.

Applications for Detector Sensing Areas

The detector sensing areas should be used as described in the following sections. You should become familiar with their locations and recommended use. The sensing areas are numbered 1 through 3.

Areas 1 and 3

Areas 1 and 3 are used to cover symmetrical body parts. For example, acquiring a chest radiograph includes the lungs, which are proportional parts of the body. In this application, Area 1 and 3 must be located in line with radiation transmitted through the left and right lung fields. This ensures these areas are not influenced by variations in tissue opacity caused by the heart or vertebrae.

If the patient is improperly positioned and the sensing areas are exposed to direct radiation, the photo timed exposures will be too short and the films underexposed. The opposite is true if the patient's thoracic spine or sternum are positioned over the sensing areas.

NOTE: Areas 1 and/or 3 are to be used with full-sized fields of 10x12 inches (254x305mm) or larger.

Area 2

The center of the X-ray beam is Area 2. The basic positioning requirements are also important when using this area. Misalignment may result in unusable images. Care should be taken when positioning the anatomical area of interest over Area 2.

When using Area 2, you may want to align the X-ray tube to the center line of Area 2 before positioning the patient. It is also recommended you collimate the light field to an area of 8¼x9¾ inches (210x 248 mm). Your light field will then be centered on Area 2 and encompasses the inner sides of Area 1 and 3. Then, when you are positioning your patient and using only Area 2, a light field 2½x4½ inches (54x114 mm), if properly centered, defines that area and can be used to align a specific region of the body.

Positioning of the patient's anatomical area of interest within the light field and readjusting the light field to the desired size, ensures the detector sensing area is aligned with the area of interest in the patient.

NOTE: Area 2 must be selected by itself whenever the X-ray field is less than 10x12 inches (254x305 mm) and in instances where the collimator field size is reduced to less than 10x10 inches (254x254 mm).

Applications

Applications for the detector sensing areas are given in Table 10-1 with the areas appearing as three adjacent square buttons. The dark-colored buttons indicate the currently selected area or areas.

When in AEC mode, at least one ion chamber must be selected. Any combination of chambers is allowed.

Figure 10-4 AEC Areas

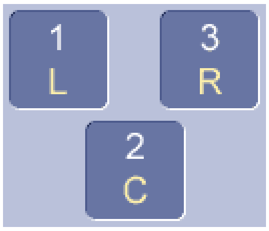
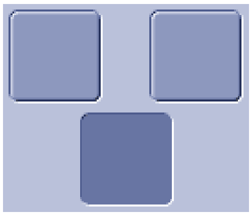
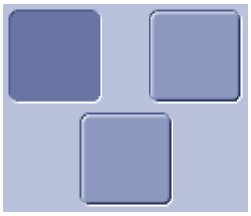
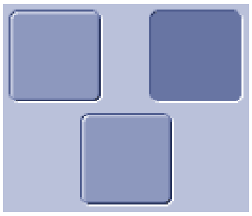
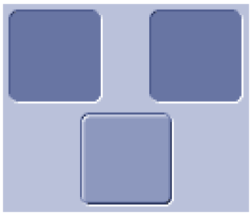
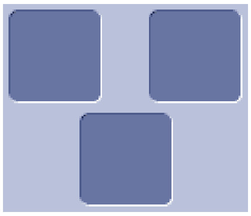


Table 10-1 Detector sensing areas

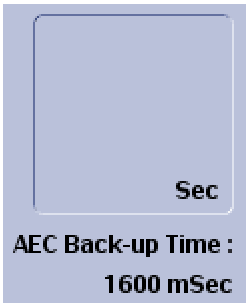
Area(s) Selected	Application	Patient Positioning
Area 2 	Controls the exposure for an area of interest at the center of the X-ray field.	The patient's area of interest is in the X-ray field center.
Area 1 	Controls the exposure for an area of interest at the upper left quadrant of the full size radiograph.	The patient's area of interest is in the upper left quadrant of the X-ray field.
Area 3 	Controls the exposure for an area of interest at the upper right quadrant of the full size radiograph.	The patient's area of interest is in the upper right quadrant of the X-ray field.
Areas 1 and 3 	Controls the exposure for two symmetrical parts of the body, such as lungs or kidneys. Because Area 2 is not selected when using areas 1 and 3 for this application, the vertical column should not affect the exposure, providing the patient is correctly positioned.	The patient's area of interest is aligned with sensing Areas 1 and 3.
All Areas 	Controls the exposure to allow the average density of the entire radiograph to approximate the value of the pre-selected density.	The patient's area of interest is within the boundary of the X-ray field.

AEC Limitation Messages

The AEC feature optimizes patient images and helps you to obtain precise exposures. Many default techniques are AEC based in order to optimize image processing. The exposure time and mAs are automatically selected when you are in AEC mode, producing uniform quality images. The system displays messages to inform you when the AEC feature reaches its limit.

When acquiring AEC images, the AEC Back-up time is displayed below the mSec area. After the exposure is taken, the current mSec is displayed (Figure 10-5).

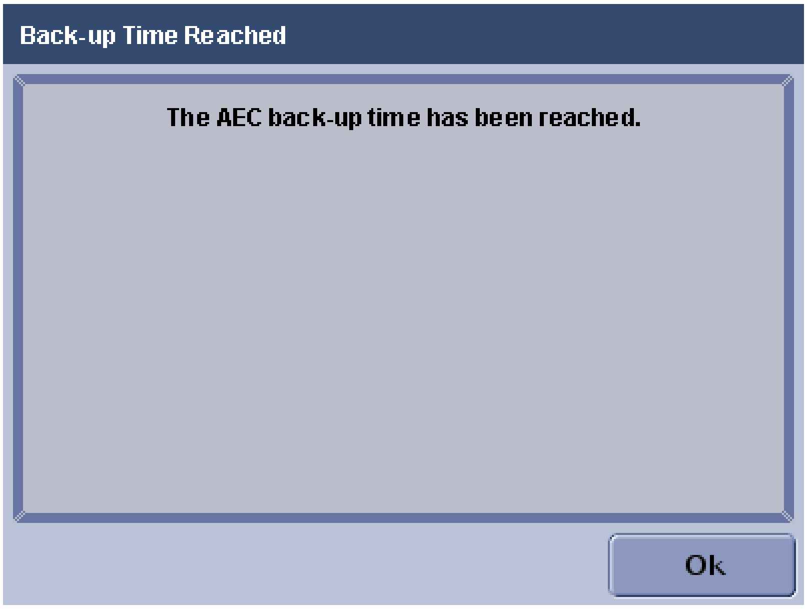
Figure 10-5 [mSec and AEC back-up time on Acquisition screen



AEC Back-up Time :
1600 mSec

When an AEC exposure reaches the back-up time limit, a message appears on screen: “The AEC back-up time has been reached.” (Figure 10-6). Click [OK] to close the message. The system will not allow you to continue taking exposures for the current protocol. To resume image acquisition, select another protocol and continue the exam.

Figure 10-6 AEC back-up time message



The AEC back-up time has been reached.

The backup time is calculated from the following three conditions:

- A 2000 millisecond limit
- A 500 mAs limit or 512 mAs limit (based on the nearest Renard step)

- An X-ray tube protection ‘formula’ limit

In this instance, the maximum exposure time reached may cause the digital image to be lighter than desired. You may wish to change the mA selected to avoid reaching one of these limitations in a subsequent exposure.

In addition to the limits provided by the Applications software, the system also has a maximum mAs limit for AEC operation.

- The maximum mAs limit ensures that if an AEC exposure exceeds 512 mAs, the maximum mAs limit terminates the exposure at values less than 600 mAs.
- Whenever the maximum mAs integrator limit (550 mAs ± 10 mAs) is reached during an AEC exposure, a message appears (Figure 10-6).

NOTE: The regular If this message appears, please confirm the approciate patient size and SID are selected.

NOTE: The regular occurrence of this message may be evidence of a malfunction in your system. Call your service engineer to assess the situation.

Acquire AEC Images

Acquiring images in the AEC mode requires precise light alignment and patient positioning.

Refer to *Chapter 7: Image Acquisition* for more information about conducting an exam.

WARNING: The ion chambers and asymmetric collimation field must match for proper exposure. Collimation must be active over the AEC chambers being used or FIXED mode must be used in order to prevent possible patient over-exposure.

Use this process to produce images with the AEC feature.

1. Open an exam from the Worklist and select the protocols.
   - The Acquisition screen appears.
2. Select the protocol to perform.
3. Change the Patient Size, if necessary.

WARNING: It is critical to select the proper patient size on the Acquisition screen. The incorrect Patient Size may result in an unnecessarily large radiation dose or multiple exposures.

4. Change the Receptor, if necessary.

5. Click [AEC], if necessary.
    - Depending on the current protocol, AEC will already be selected by default.
    - The AEC mode displays the Ion Chamber selections.
    - The Fixed mode removes the Ion Chamber selections.
    - You are able to alter this selection at any time to accommodate the requirements of a specific examination.
6. Change the selected Ion Chambers, if necessary.
    - Selected (active) AEC cells will appear highlighted on the acquisition screen.
7. Make other technique adjustments as necessary.
    - You are able to adjust the kV, mA, Focal Spot, and Cu Filter.
8. Position the patient so that the anatomy of interest is centered over the selected AEC cells.

NOTE: The body part must cover the selected ion chambers in order to achieve the appropriate exposure.

9. Collimate the light field to encompass the detection area being used.
10. Align the detector and light field.
11. Collimate to the desired area. This ensures the detector sensing area is aligned with the patient’s anatomy.
12. Confirm the Patient Position. Change if necessary.
13. Make the exposure.
14. If the AEC Back-up Reached message appears: Click [OK].
    - The message closes.
15. Select another protocol and continue the exam.

Manual Exposure Mode

Except for AEC, system set up a manual exposure mode to each exposure view. In manual exposure mode, “kV, mA, mAs“ can be manually adjusted to select the satisfied exposure parameters.

Method

Press “Fix“ on the right-top of the exposure screen to select Manual Exposure mode.

Adjust “kV, mA, mAs“ parameters as required, and then take exposures.

Chapter 11

Digital Detector Application

This section is intended to outline the digital detector's specification and shift application.

Topics covered include:

- *Applications*
  - *Digital Wall Stand Mode*
  - *Digital Table Mode*
  - *Digital Table Top (Stretcher Table Top) Mode*

Applications

The digital detector of this system can be shift between the Digital Wall Stand and Digital Table (Radiographic Stretcher Table / Patient Stretcher).

Operation process:

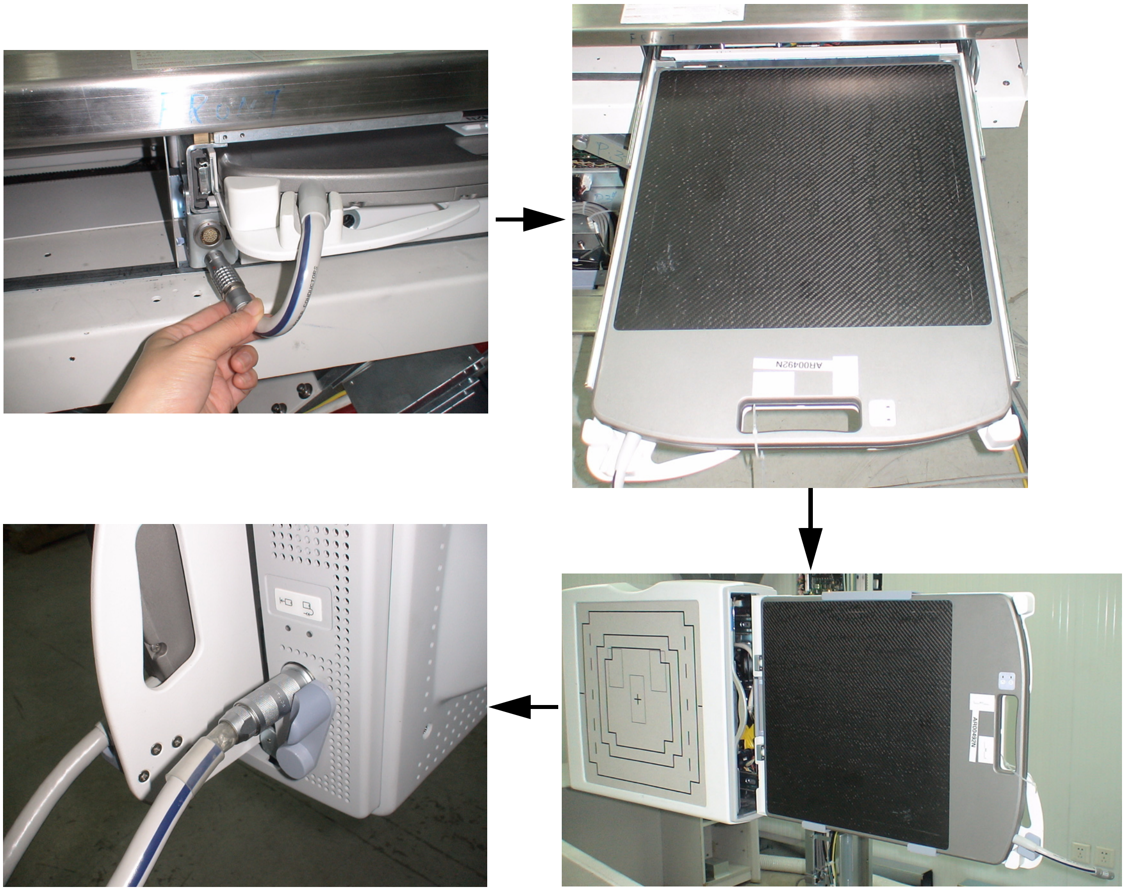
Input patient's information -> Select Protocols -> Select the digital detector location (Digital Wall Stand or Digital Table) -> Move digital detector to the appropriate location -> Patient positioning -> Take exposures.

Applications as below:

Digital Wall Stand Mode

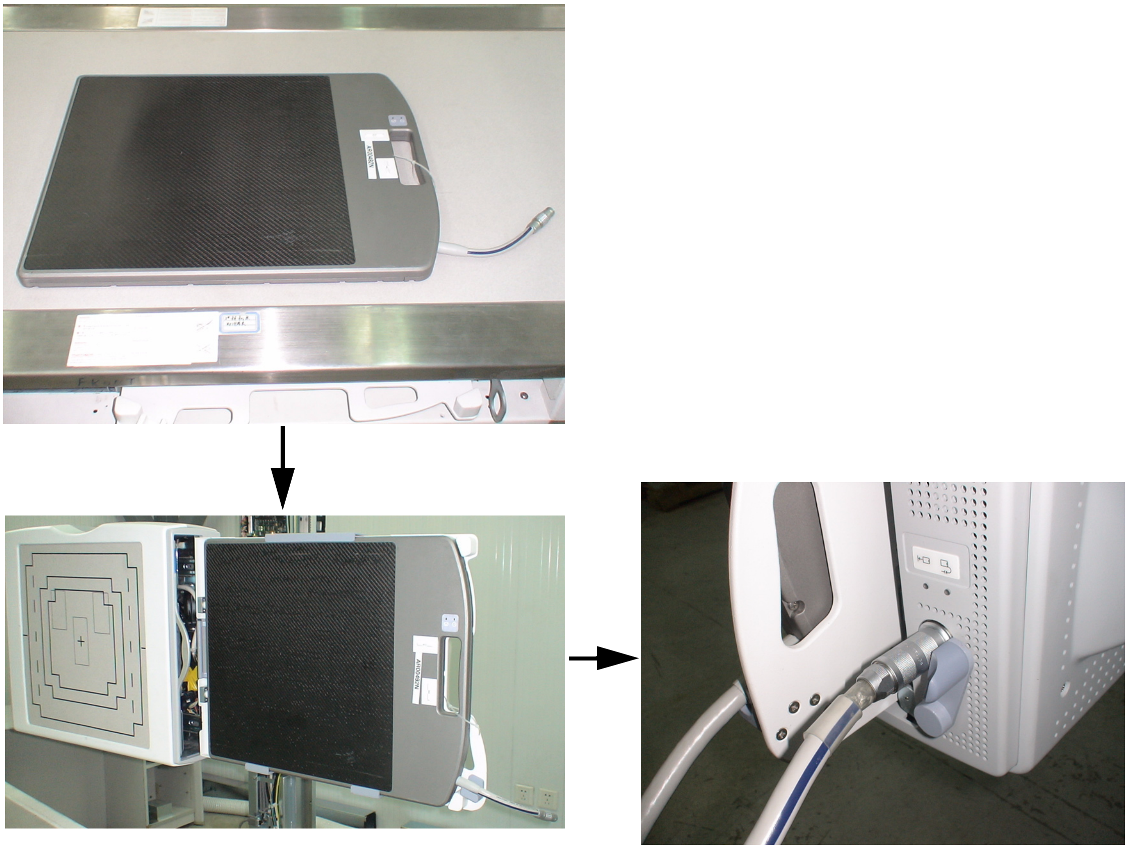
From Digital Table Detector Tray to Digital Wall Stand

Disconnect digital detector cable from table cable connector -> Pull out table detector tray -> Take out digital detector -> Pull out wall stand detector tray -> Load digital detector -> Connect digital detector cable to wall stand cable connector.



From Digital Table Top (or Stretcher Table Top) to Digital Wall Stand

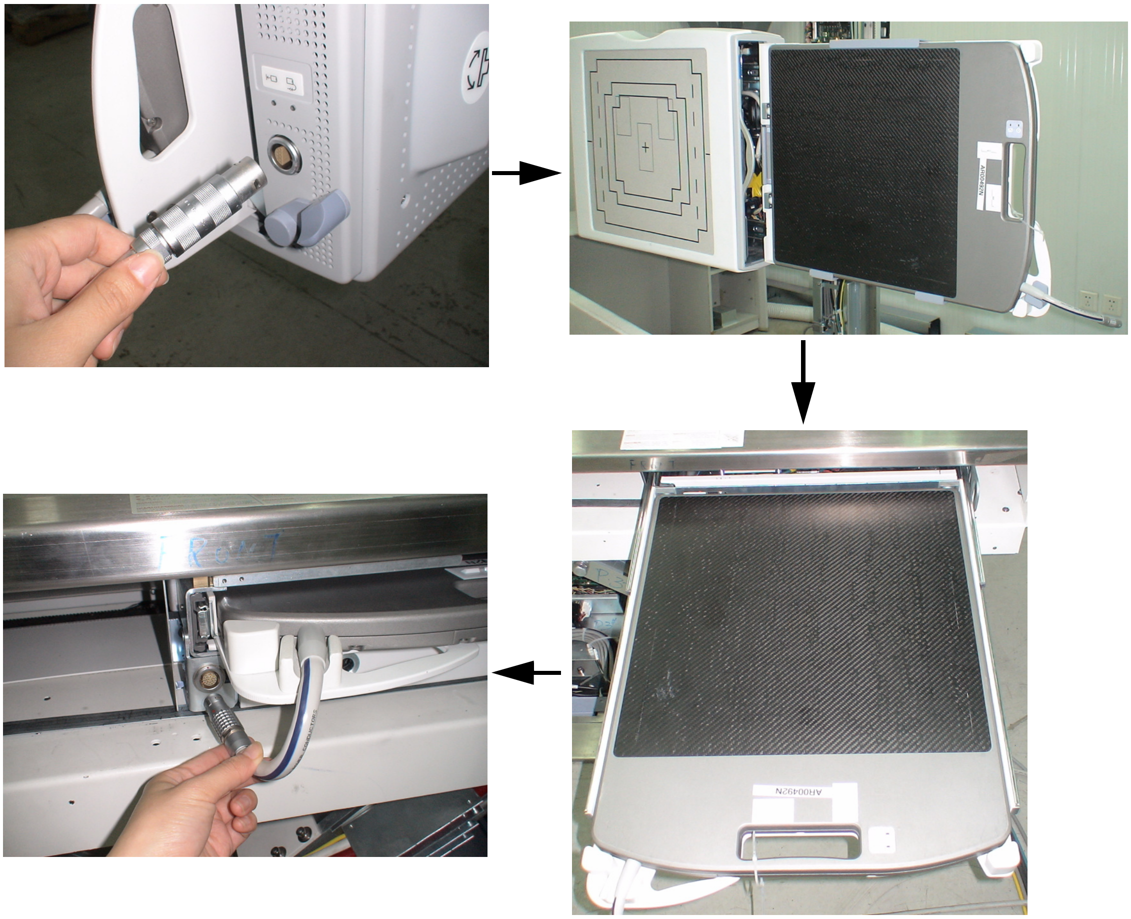
Disconnect digital detector cable from extended cable connector -> Pull out wall stand detector tray -> Load digital detector -> Connect digital detector cable to wall stand cable connector.



Digital Table Mode

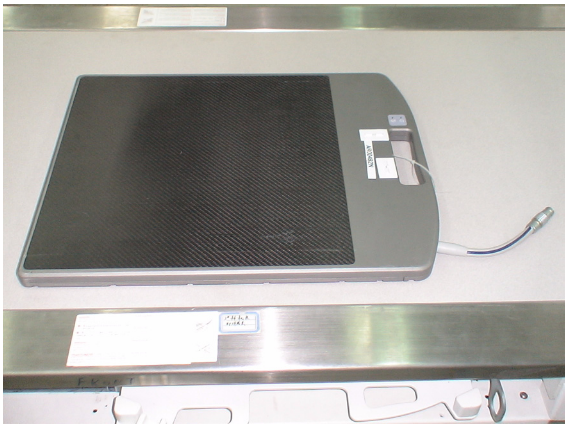
From Digital Wall Stand to Digital Table Detector Tray

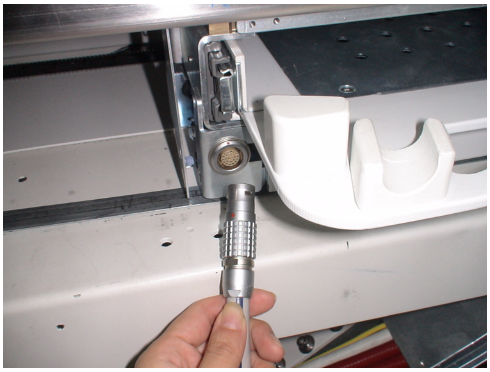
Disconnect digital detector cable from wall stand cable connector -> Pull out wall stand detector tray -> Take out digital detector -> Pull out table detector tray -> Load digital detector -> Connect digital detector cable to table cable connector.

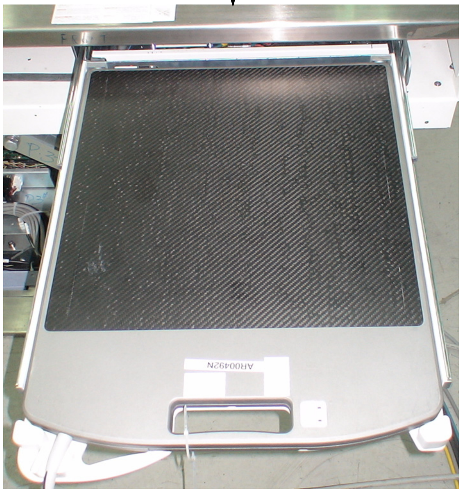


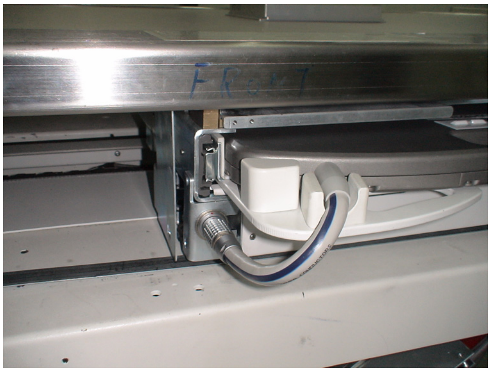
From Digital Table Top (or Stretcher Table Top) to Digital Table Detector Tray

Disconnect extended cable connector in two ends -> Pull out table detector tray -> Load digital detector -> Connect digital detector cable to table cable connector.





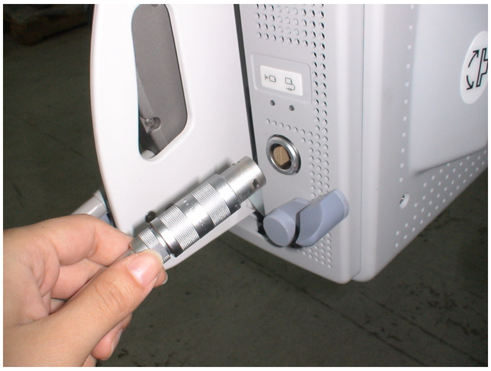


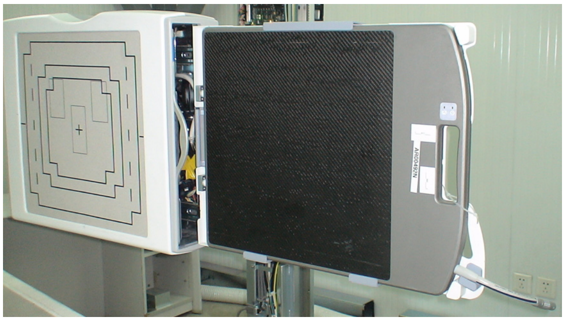


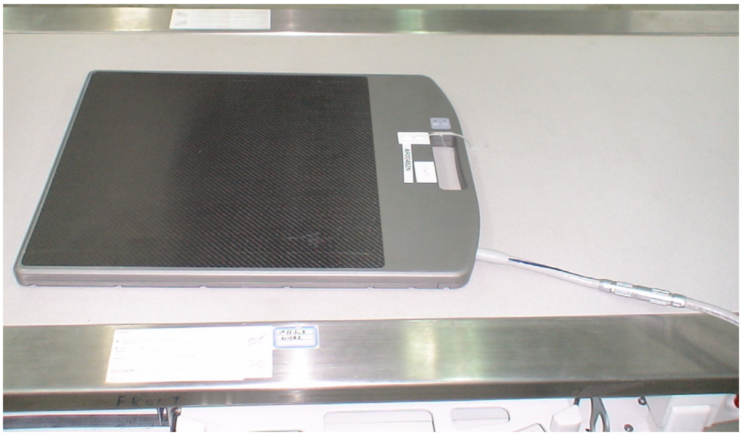
Digital Table Top (Stretcher Table Top) Mode

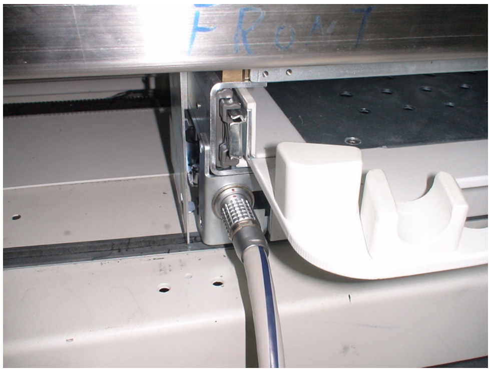
From Digital Wall Stand to Digital Table Top (or Stretcher Table Top)

Disconnect digital detector cable from wall stand cable connector -> Pull out wall stand detector tray -> Take out digital detector -> Put it onto table top -> Connect digital detector cable to table cable connector by extended cable.



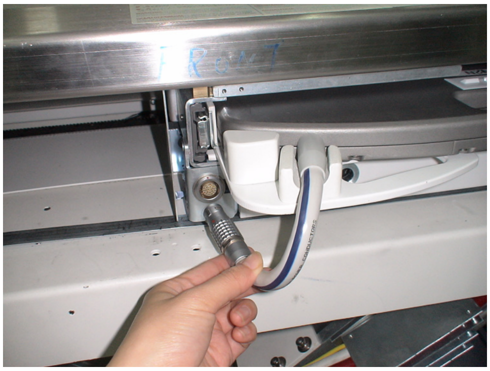


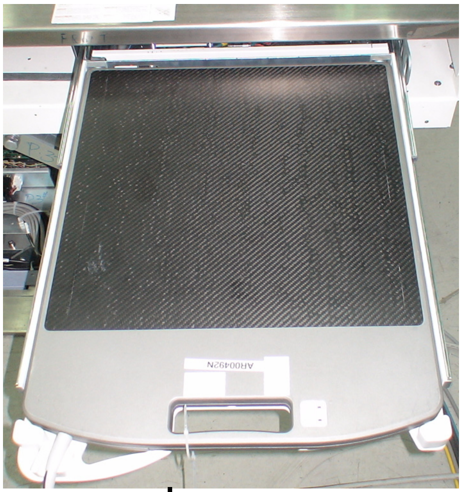


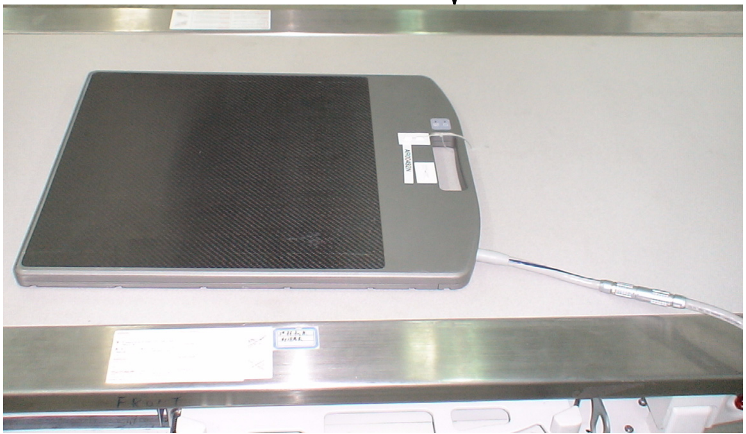


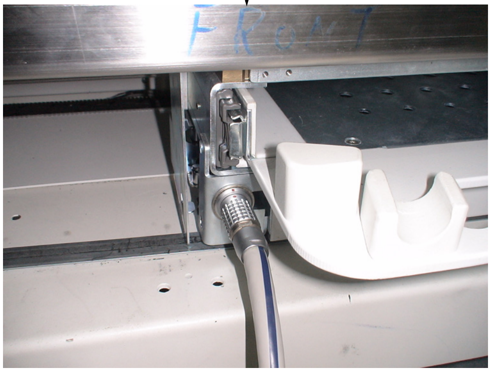
From Digital Table Detector Tray to Digital Table Top (or Stretcher Table Top)

Disconnect digital detector cable from table cable connector -> Pull out table detector tray -> Take out digital detector -> Put it onto table top -> Connect digital detector cable to table cable connector by extended cable.









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Chapter 12

Dual Energy Exposure

This chapter explains the system dual-energy exposure.

Topics covered include:

- *Overview*
- *Technical setup and image quaulity*
  - *Patient Size*
  - *High KVp*
  - *Low KVp*
  - *Grid*
- *Acquisition and Image Operation*
- *Patient dose*

Overview

Dual energy (DE) imaging, which uses an imaging technique of rapid and sequential image acquisition with low and high KVp to process acquired images, allows for the creation of soft-tissue and bone images along with the presentation of standard (high KVp) images. DE makes it possible to remove bone structure and shows great potential in the improvement of the significance of chest pathological conditions.It is also potent in increasing the specificiy with the provision of the information about the grey substance of a bone image.

⚠

WARNING: For the same patient, it is not allowed to have both dual energy and CT procedures within a month.

WARNING: Dual ennergy procedure is not recommended for patients under 16 years of age.

NOTE: Suggest to use the default parameters to do DE exposures.

NOTE: Dual energy is only applied to the full digital procedures, i.e .the procedures with a digital detector as the receptor. It is not intented to be used for cassette and IP procedures.

Technical setup and image quaulity

NOTE: At present,DE Acquisition is only activated in chest posterior-anterior position (PA),chest anterior-posterior position (AP), abdomen AP and abdomen PA.DE may result in poor image quality when used for other anatomies and/or children.

Patient Size

Appropriate setup of patient size needs to be selected for:

- The correction of patient dose allocated between 2 exposures.
- The optimization of image quality.

Recommended range of thickness:

- Small Adult - patient measure < 22 cm
- Medium Adult - patient measure between 22 cm and 27 cm
- Large Adult - patient measure > 27 cm

High KVp

KVp may be set to anywhere between 110 and 150, which is determined based on the standard (non-dual energy) chest protocol/technical values.

Low KVp

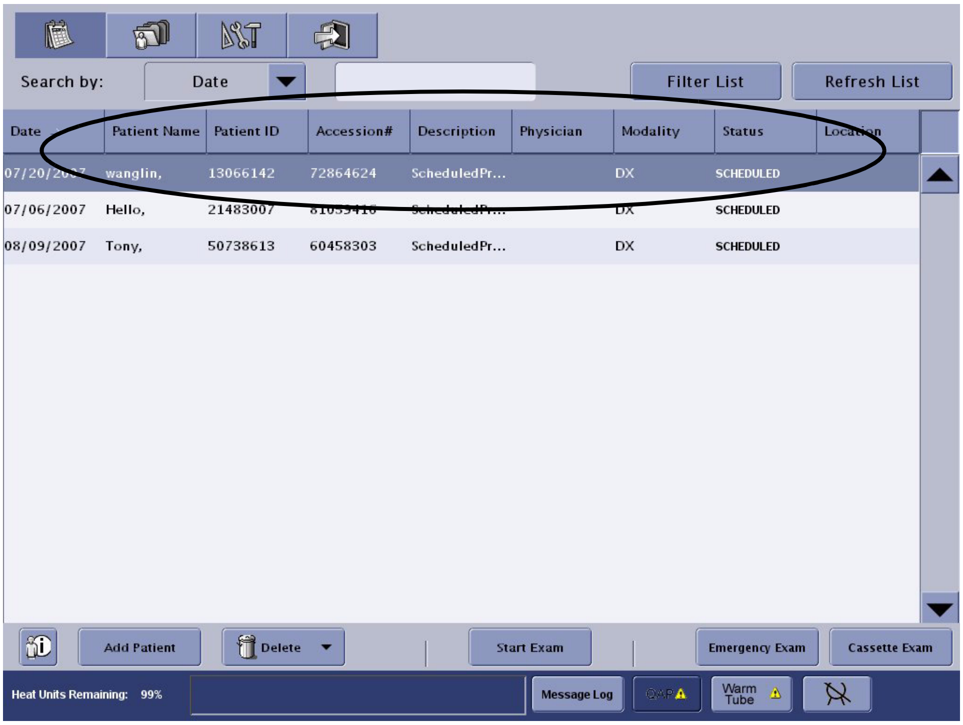
KVp may be set to anywhere between 60 and 80.Generally, low KVp lower than the default contributes to achieving better tissue removal results. For a patient of large size, slight increase in low KVp allows for enhancing the penetrting power of X rays. Therefore, it is possible that the noise features of soft-tissue and bone images may be boosted.

Grid

Please use grid during DE exposures. Exposures will not be inhibited if there is no grid, but it will obviously impact the image quality.

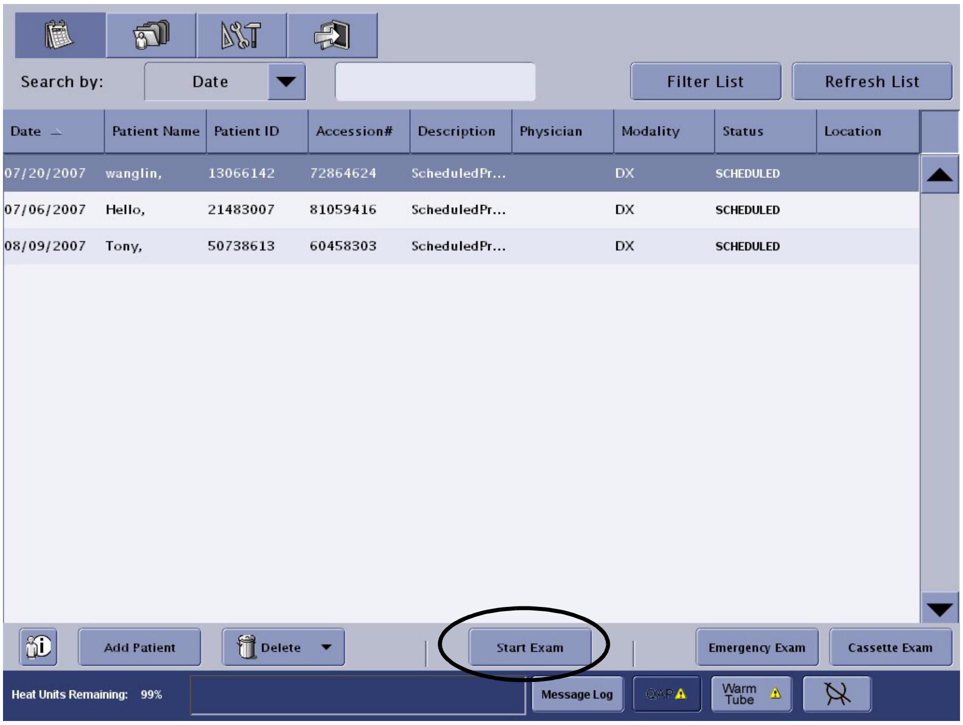
Acquisition and Image Operation

1. Select Patient on the worklist interface.


Search by:
Date
Filter List
Refresh List
Add Patient
Delete
Start Exam
Emergency Exam
Cassette Exam
Heat Units Remaining: 99%
Message Log
QAP
Warm Tube

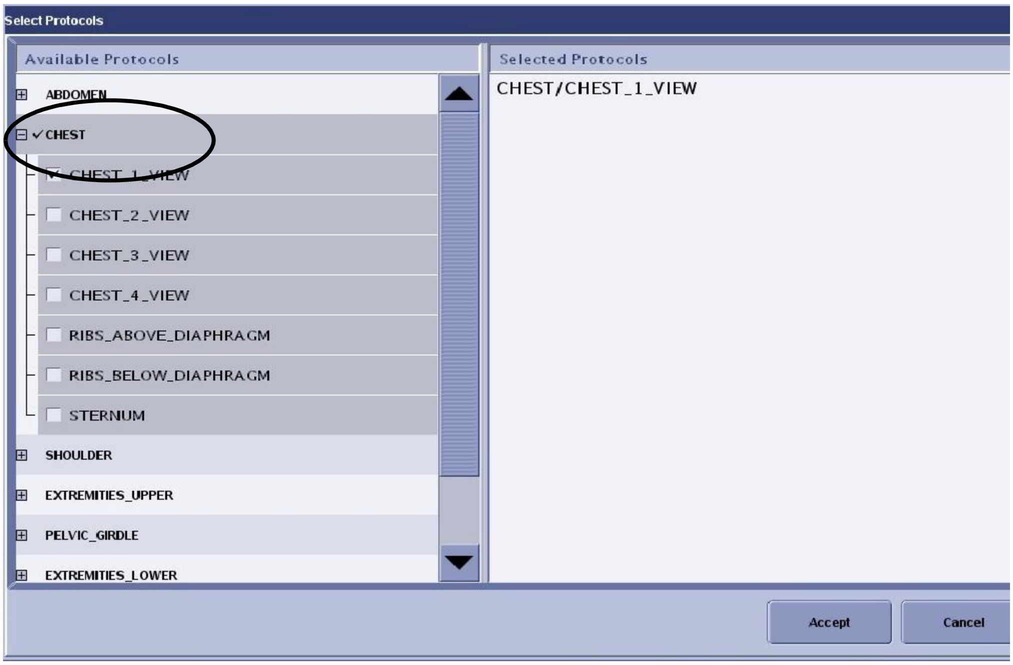
Date	Patient Name	Patient ID	Accession#	Description	Physician	Modality	Status	Location
07/20/2007	wanglin,	13066142	72864624	ScheduledPr...		DX	SCHEDULED	
07/06/2007	Hello,	21483007	81059416	ScheduledPr...		DX	SCHEDULED	
08/09/2007	Tony,	50738613	60458303	ScheduledPr...		DX	SCHEDULED	

2. Click "Start Exam" (Resume/Append).


Search by:
Date
Filter List
Refresh List
Add Patient
Delete
Start Exam
Emergency Exam
Cassette Exam
Heat Units Remaining: 99%
Message Log
QAP
Warm Tube

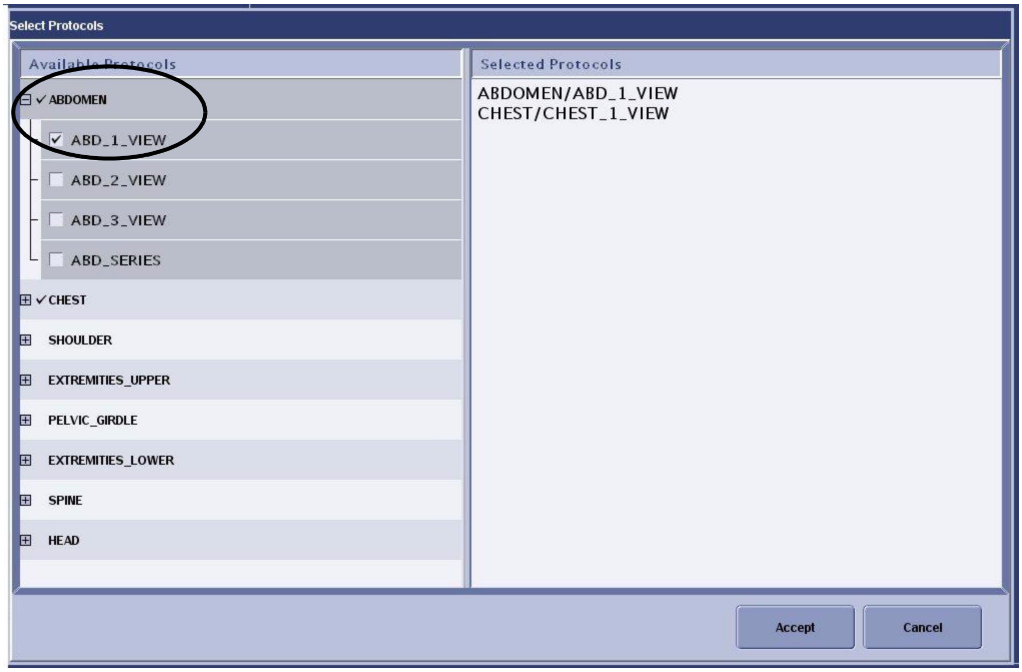
Date	Patient Name	Patient ID	Accession#	Description	Physician	Modality	Status	Location
07/20/2007	wanglin,	13066142	72864624	ScheduledPr...		DX	SCHEDULED	
07/06/2007	Hello,	21483007	81059416	ScheduledPr...		DX	SCHEDULED	
08/09/2007	Tony,	50738613	60458303	ScheduledPr...		DX	SCHEDULED	

3. Select “Chest“ on the Available Protocols interface.


Select Protocols
Available Protocols
ABDOMEN
✓ CHEST
☑ CHEST_1_VIEW
☐ CHEST_2_VIEW
☐ CHEST_3_VIEW
☐ CHEST_4_VIEW
☐ RIBS_ABOVE_DIAPHRAGM
☐ RIBS_BELOW_DIAPHRAGM
☐ STERNUM
SHOULDER
EXTREMITIES_UPPER
PELVIC_GIRDLE
EXTREMITIES_LOWER
Selected Protocols
Accept
Cancel

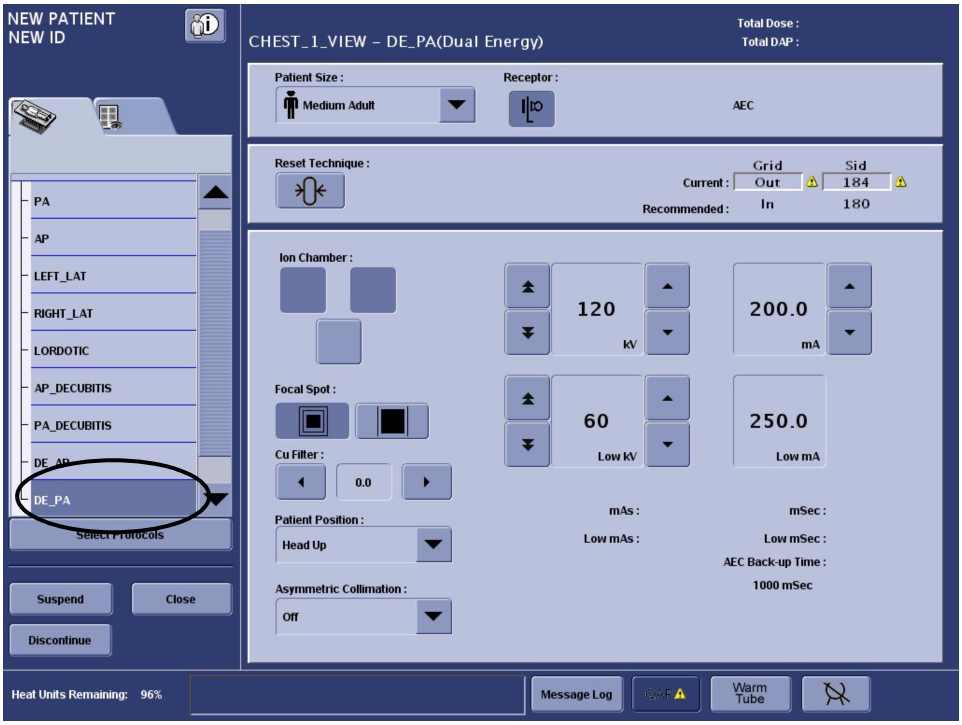
CHEST/CHEST_1_VIEW

4. Select “Abdomen“ on the Available Protocols interface.


Select Protocols
Available Protocols
✓ ABDOMEN
☑ ABD_1_VIEW
☐ ABD_2_VIEW
☐ ABD_3_VIEW
☐ ABD_SERIES
✓ CHEST
SHOULDER
EXTREMITIES_UPPER
PELVIC_GIRDLE
EXTREMITIES_LOWER
SPINE
HEAD
Selected Protocols
Accept
Cancel

ABDOMEN/ABD_1_VIEW
CHEST/CHEST_1_VIEW

5. Select “Chest DE_PA“ on the Available Protocols interface.


NEW PATIENT
NEW ID
PA
AP
LEFT_LAT
RIGHT_LAT
LORDOTIC
AP_DECUBITIS
PA_DECUBITIS
DE_AP
DE_PA
Select Protocols
Suspend
Close
Discontinue
Reset Technique :
Ion Chamber :
Focal Spot :
mAs :
Low mAs :
mSec :
Low mSec :
Message Log
QAP
Warm Tube

CHEST_1_VIEW – DE_PA(Dual Energy)

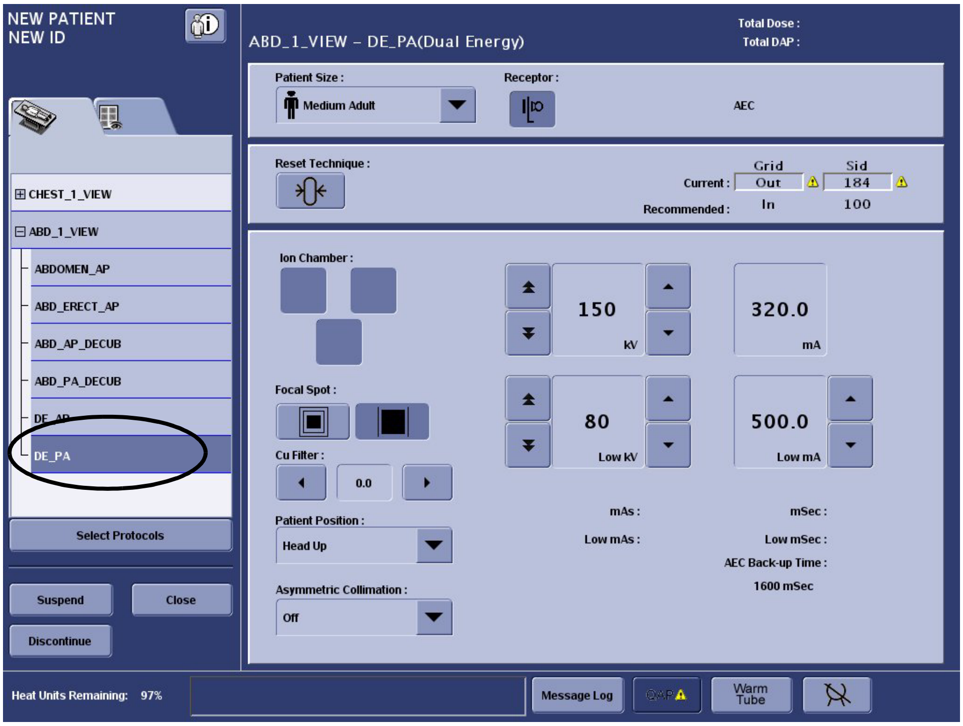
Total Dose :
Total DAP :

Patient Size : Medium Adult
Receptor : AEC

	Grid	Sid
Current :	Out	184
Recommended :	In	180

kV: 120
mA: 200.0
Low kV: 60
Low mA: 250.0
Cu Filter : 0.0
Patient Position : Head Up
Asymmetric Collimation : Off
AEC Back-up Time : 1000 mSec
Heat Units Remaining: 96%

6. Select “Abdomen DE_PA“ on the Available Protocols interface.


NEW PATIENT
NEW ID
⊞ CHEST_1_VIEW
⊟ ABD_1_VIEW
ABDOMEN_AP
ABD_ERECT_AP
ABD_AP_DECUB
ABD_PA_DECUB
DE_AP
DE_PA
Select Protocols
Suspend
Close
Discontinue
Reset Technique :
Ion Chamber :
Focal Spot :
mAs :
Low mAs :
mSec :
Low mSec :
Message Log
QAP
Warm Tube

ABD_1_VIEW – DE_PA(Dual Energy)

Total Dose :
Total DAP :

Patient Size : Medium Adult
Receptor : AEC

	Grid	Sid
Current :	Out	184
Recommended :	In	100

kV: 150
mA: 320.0
Low kV: 80
Low mA: 500.0
Cu Filter : 0.0
Patient Position : Head Up
Asymmetric Collimation : Off
AEC Back-up Time : 1600 mSec
Heat Units Remaining: 97%

7. Take exposure.

NOTE: Dual energy exposure produces 2 buzzs (the firs indicates low kV exposure, the second high kV exposure). The Prep/Expose button is released only after the second buzz ends.Please note that for some patients of large size the two buzzs may merge into one, producing a buzz lasting longer.The Prep/Expose button is not to be released until the buzz ends.

NOTE: In dual energy acquisition, it is extremely important for the patient not to move or breathe during exposure. Too much movement of the extremeties of the patient may result in redundant rib contrast in the image of soft-tissue.

8. Dual energy image generation (take chest exam as an example, image is generated in the following order).

Figure 12-7 Standard image (the same as the image by single energy exposure)

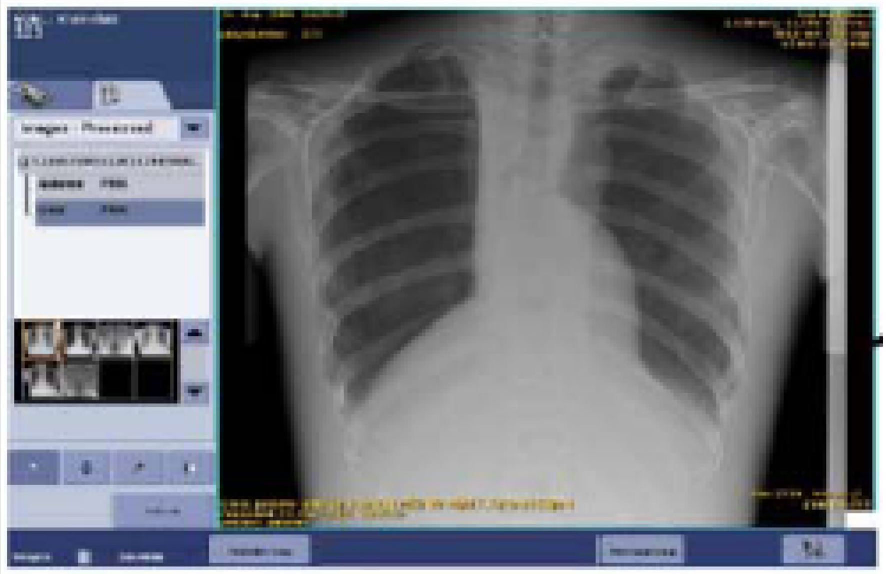


Figure 12-8 Soft-tissue image (with bone removed soft-tissue is highlighted)

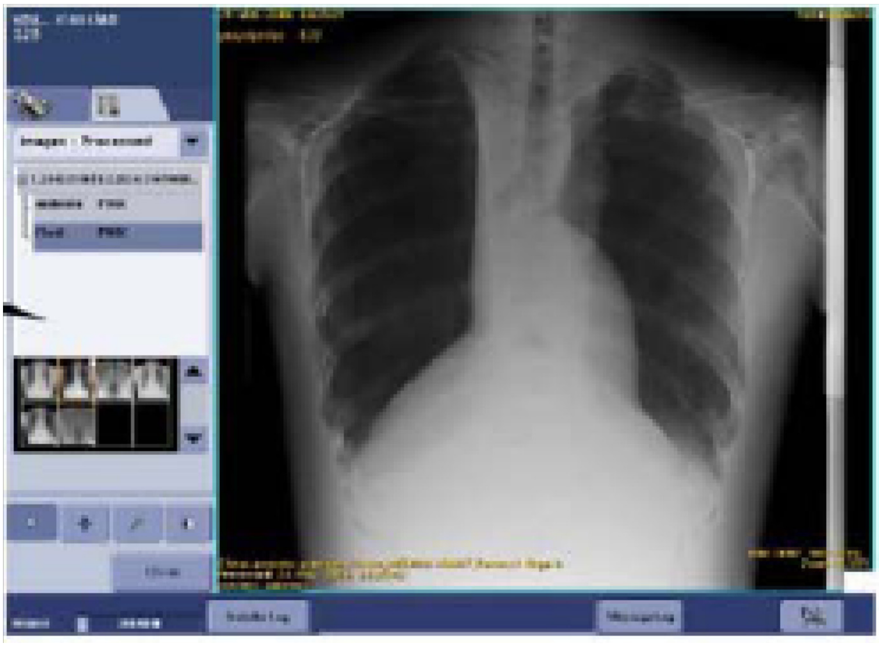
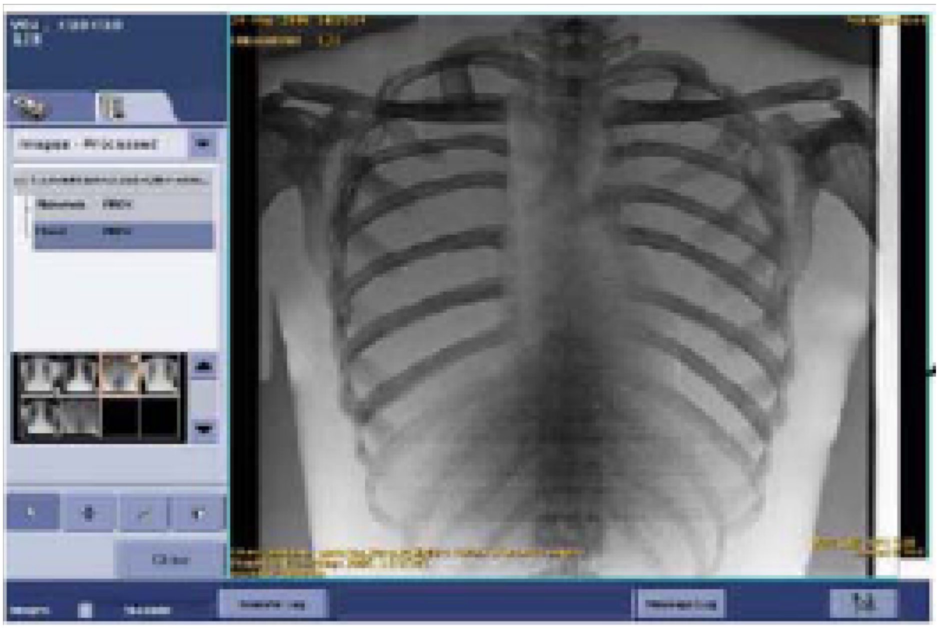
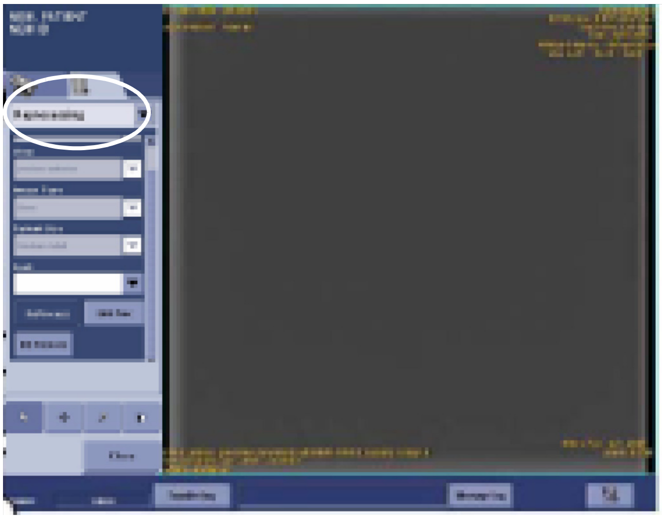


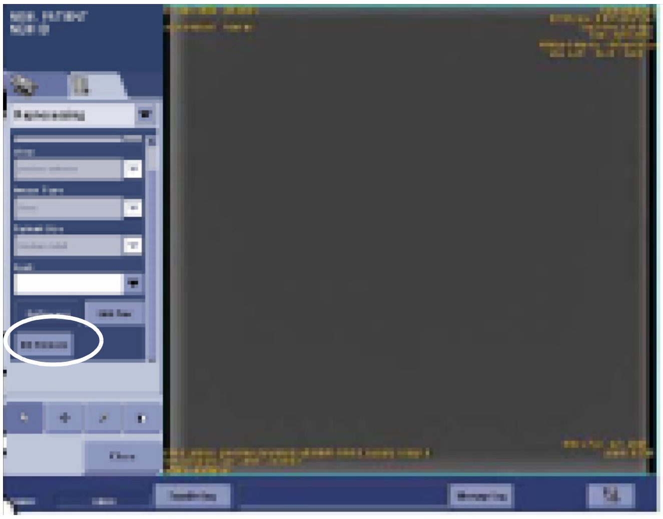
Figure 12-9 Bone image (with soft-tissue removed bone is highlighted)



9. Postprocesing of dual energy image.
   a) The processing of each dual energy image is the same as that of single energy image, which is done by selecting the ”image reprocessing tool bar”.



   b) What is differnent is that a "DE Restore" is Added. Click "DE Restore" and the raw image is processed once more to produce a soft-tissue image and a bone image, both of which are the same as the soft-tissue and bone images. They are conductive to the restoration of the images of initial exposure.



NOTE: The Image Processing Preferences editor can be used to select / self-define the various appearance atributes(brightness, contrast and Edge) of the standard soft-tissue and bone images.

There are following excepions:

Noise Reduction does not apply to soft-tissue or bone images, since these kinds of images have received special processing including noise inhibition.

Application of Tissue Equalization to "non-standard anatomical structures" may lead to the change in image brightness. It is suggested that the Tissue Equalization for soft-tissue and bone images be inactivated (the intensity and the area are set to zero).

Patient dose

If the setup of patient size is appropriately selected, the entrance dose (kerma) of low KVp exposure is equal to the dose of high KVp exposure received. For a typical two-view chest X-ray,the dose for lateral view is far higher than that for P-A or A-P view. The dose for a DE chest exam (low KVp P-A or A-P,high KVp P-A or A-P and standard LAT) is usually 120% to 130% of the dose for a non-DE chest exam (high KVp P-A or A-P and standard LAT).

Soft-tissue and bone images are not acquired but derived(i.e. created from image process algorithm) and not provided with dose estimates. But the dual images acquired (high kVp and low kVp) are provided with the data.

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Chapter 13

Quality Assurance Process

This chapter explains the Quality Assurance and Maintenance process for the GE Portable DR Detector. To assure continued performance of the GE Portable DR Detector, a periodic inspection program must be established.

The Quality Assurance Process (QAP) consists of a series of tests that should be performed weekly on your system to quantify image quality. Many of the background tasks in this procedure have been automated and require the acquisitions to be performed in the prescribed order.

Topics covered include:

- *When to Perform QAP*
  - *Normal QAP*
- *QAP Preparation*
- *Perform Normal QAP*
  - *Failed Normal QAP*
- *Result History*

A full QAP test that requires taking exposures of a flat field phantom. The results (pass or fail) are recorded in a results history summary for service personnel review. The Normal QAP test can be performed in approximately 15 minutes.

The Normal QAP test includes all the tests that are performed for Detector Check and tests additional factors. A comparison of testing factors is listed in Table 13-1.

Table 13-1 QAP testing factors

Normal QAP
• Electronic Noise
• Correlated Noise
• ARC Digital Tests
• ARC Analog Tests
• Vertical Bar Calibration
• Border Check
• Homogeneity Histogram
• Brightness Non-Uniformity
• Bad Pixels

When to Perform QAP

This section describes the recommended QAP schedule and any other events that warrant QAP to be performed

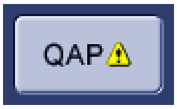
Normal QAP

Normal QAP should be performed:

- On a scheduled, weekly basis.
- When the alert icon appears on the QAP button (Figure 13-1).
- When there is a loss of image quality.

NOTE: When scheduling Normal QAP tests, plan 15-20 minutes to perform the test. One portion of the test requires that the system be in an idle state (i.e., without exposures) for at least 10 minutes. The rest of the test requires approximately 5 minutes to complete.

Figure 13-1 QAP button with alert icon



QAP Preparation

Before starting QAP, be sure to do the following:

- Close or suspend any open exams
- Close any exam being reviewed
- Clear all objects from detector and beam path (Normal QAP only)

The QAP process begins when the QAP button is clicked. The button is located at the bottom of the Worklist or Acquisition screen.

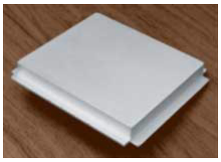
NOTE: QAP cannot be performed if an exam is open or being reviewed.

Perform Normal QAP

Normal-QAP involves tests requiring exposures with the flat field phantom. The GE Portable DR Detector QAP kit includes a flat-field phantom (Figure 13-1) sized to fit the collimator.

There are recommended exposure techniques for the phantom. The exposure is automatically set by the system, but you should verify the settings prior to making an exposure.

Figure 13-1 Flat-field phantom



Follow this process to perform a Normal QAP test.

1. Press the [QAP] button at the bottom of the Worklist or Acquisition screen.
    - The Image Quality screen appears.

Figure 13-2 Image Quality screen

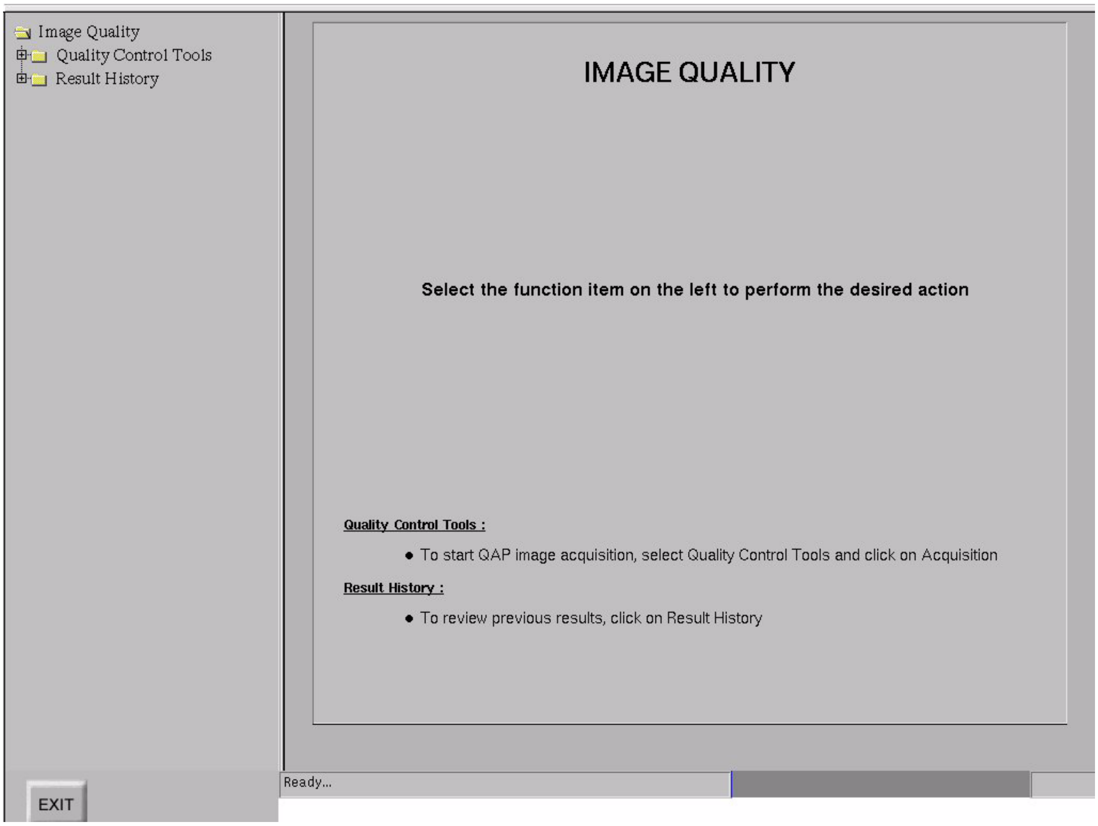


IMAGE QUALITY

Select the function item on the left to perform the desired action

Quality Control Tools :

- To start QAP image acquisition, select Quality Control Tools and click on Acquisition

Result History :

- To review previous results, click on Result History

2. Select **Image Quality** from the left side of the screen (Figure 13-3).

Figure 13-3 QAP selection from left side of screen

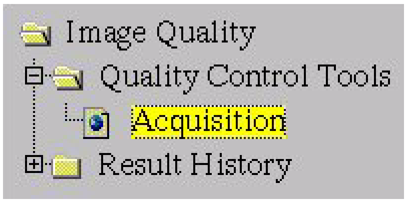


Image Quality
Quality Control Tools
Acquisition
Result History

3. Select **Quality Control Tools** from the left side of the screen.

4. Select **Acquisition** from the left side of the screen.
   - The QAP Start screen appears.

5. Press [QAP] to start QAP test.

Figure 13-4 QAP Start screen

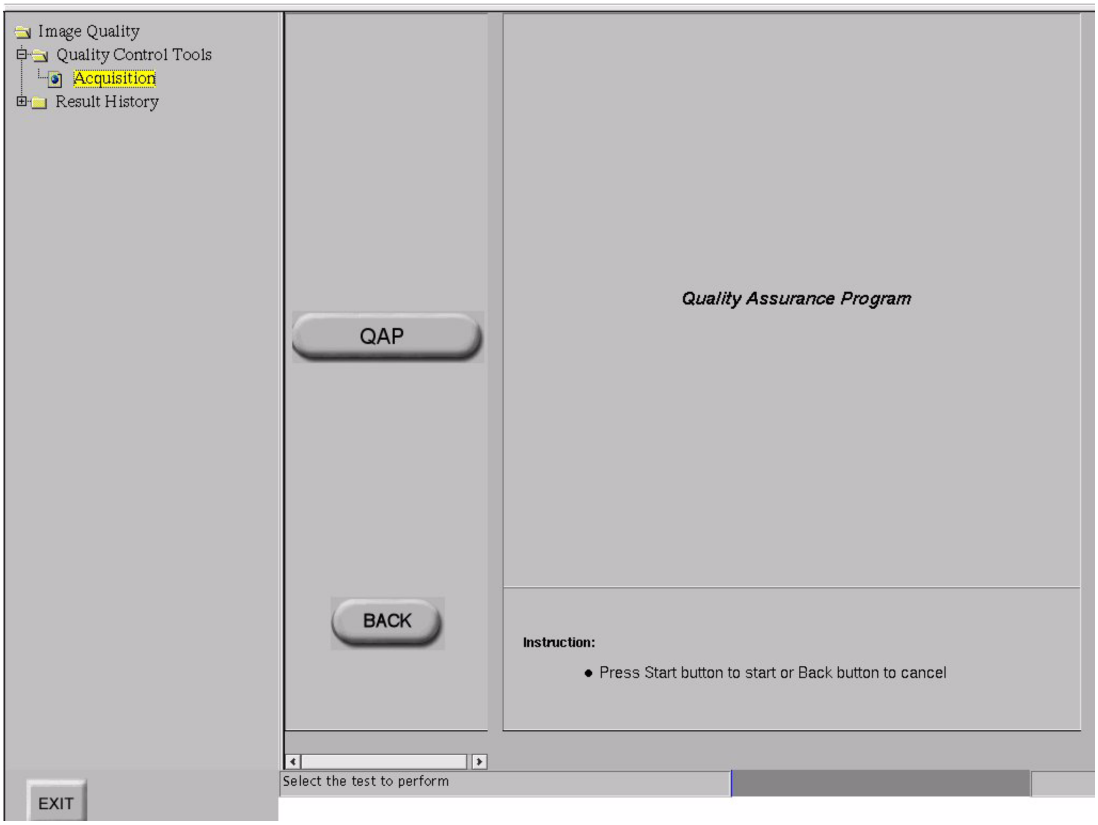


Image Quality
Quality Control Tools
Acquisition
Result History
QAP
BACK
EXIT
Quality Assurance Program

Instruction:

- Press Start button to start or Back button to cancel

Select the test to perform

6. Press the [START] button to begin the Vertical Bar Calibration test.

NOTE: Normal QAP requires that the system be in an idle state (without exposures) for at least 10 minutes before the Vertical Bar Calibration portion of the test can begin. The system will display a timer icon on the Q-QAP and Vertical Bar Calibration screens. The timer counts down the time from 10 minutes until it reaches 0. During this time, the [INHIBIT] button is displayed and the [START] button is disabled.

Figure 13-5 Vertical Bar Calibration test screen

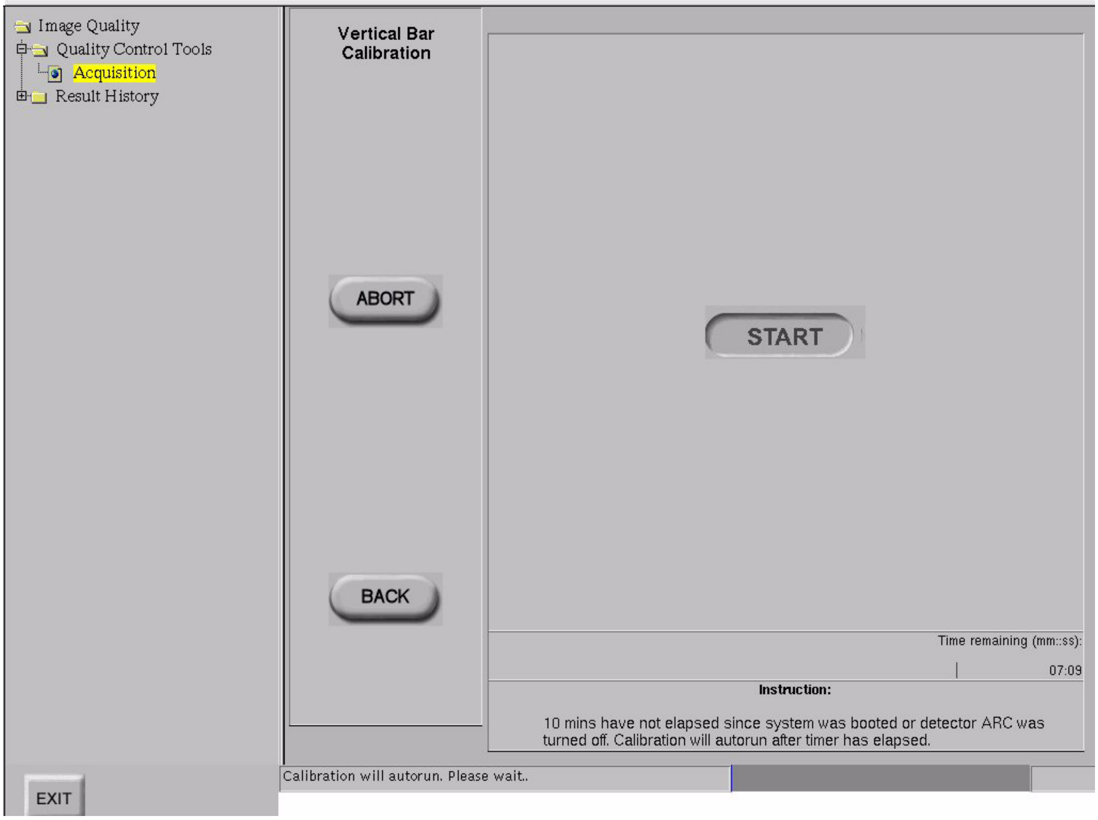


Image Quality
Quality Control Tools
Acquisition
Result History
Vertical Bar Calibration
ABORT
BACK
START
EXIT

Time remaining (mm::ss): 07:09

Instruction:

10 mins have not elapsed since system was booted or detector ARC was turned off. Calibration will autorun after timer has elapsed.

Calibration will autorun. Please wait..

7. Wait for the test to complete.
   - The Detector Check Tests screen appears.

Figure 13-6 Detector check tests

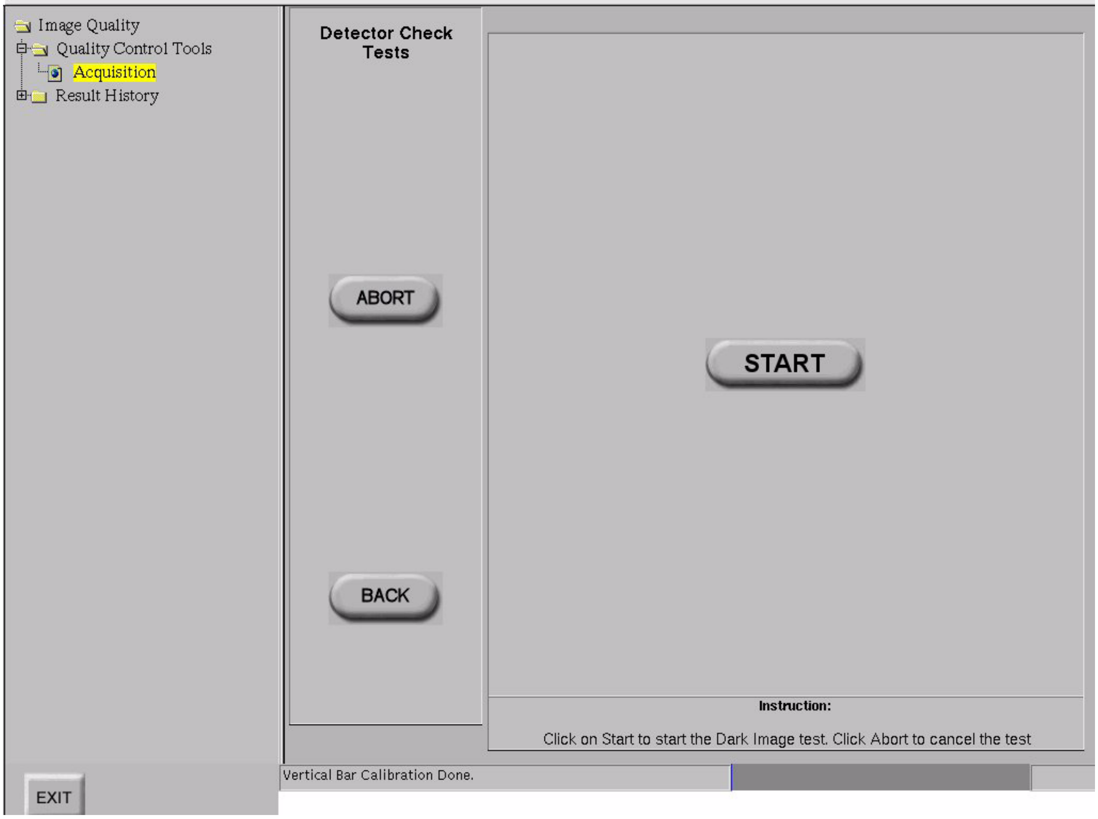


Image Quality
Quality Control Tools
Acquisition
Result History
Detector Check Tests
ABORT
BACK
START
EXIT

Instruction:

Click on Start to start the Dark Image test. Click Abort to cancel the test

Vertical Bar Calibration Done.

8. Press [START] to begin the Dark Images Tests.

Figure 13-7 Start dark images tests

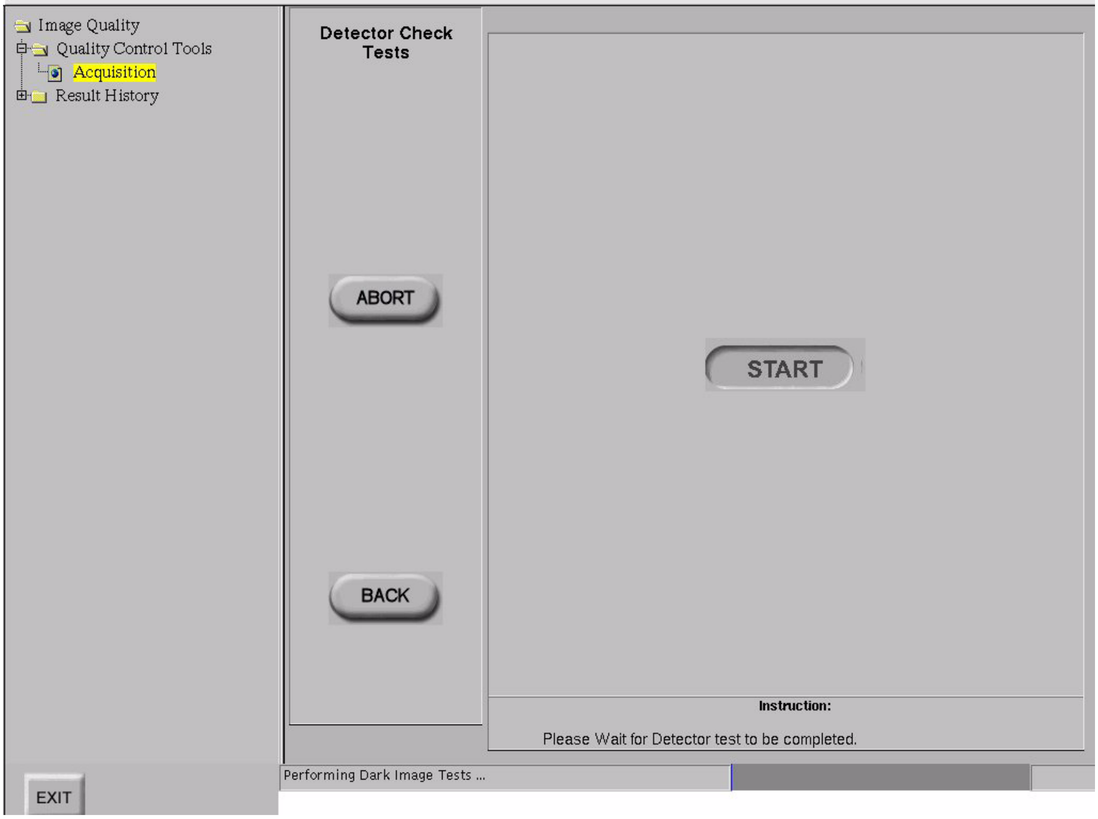


Image Quality
Quality Control Tools
Acquisition
Result History
Detector Check Tests
ABORT
BACK
START
EXIT

Instruction:

Please Wait for Detector test to be completed.

Performing Dark Image Tests ...

9. After application setup is complete, follow the instructions on screen to complete this portion of the test:
   a) Remove the grid, if necessary.
   b) Manually align tube to detector using collimator light field to expose the entire detector surface.
   c) Insert flat-field phantom into the collimator rail.
   d) Prep and expose the flat-field phantom.

Figure 13-8 Dark images tests

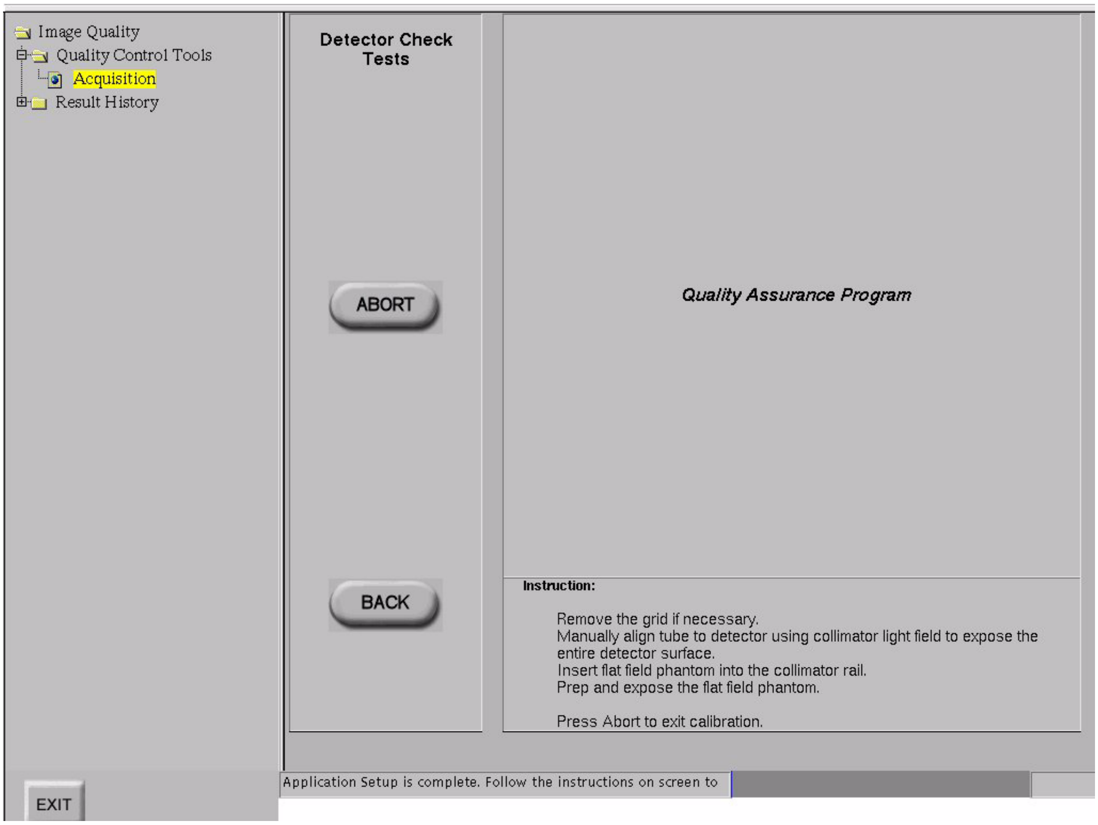


Image Quality
Quality Control Tools
Acquisition
Result History
Detector Check Tests
ABORT
BACK
EXIT
Quality Assurance Program

Instruction:

Remove the grid if necessary.
Manually align tube to detector using collimator light field to expose the entire detector surface.
Insert flat field phantom into the collimator rail.
Prep and expose the flat field phantom.

Press Abort to exit calibration.

Application Setup is complete. Follow the instructions on screen to

- The QC checks screen appears.

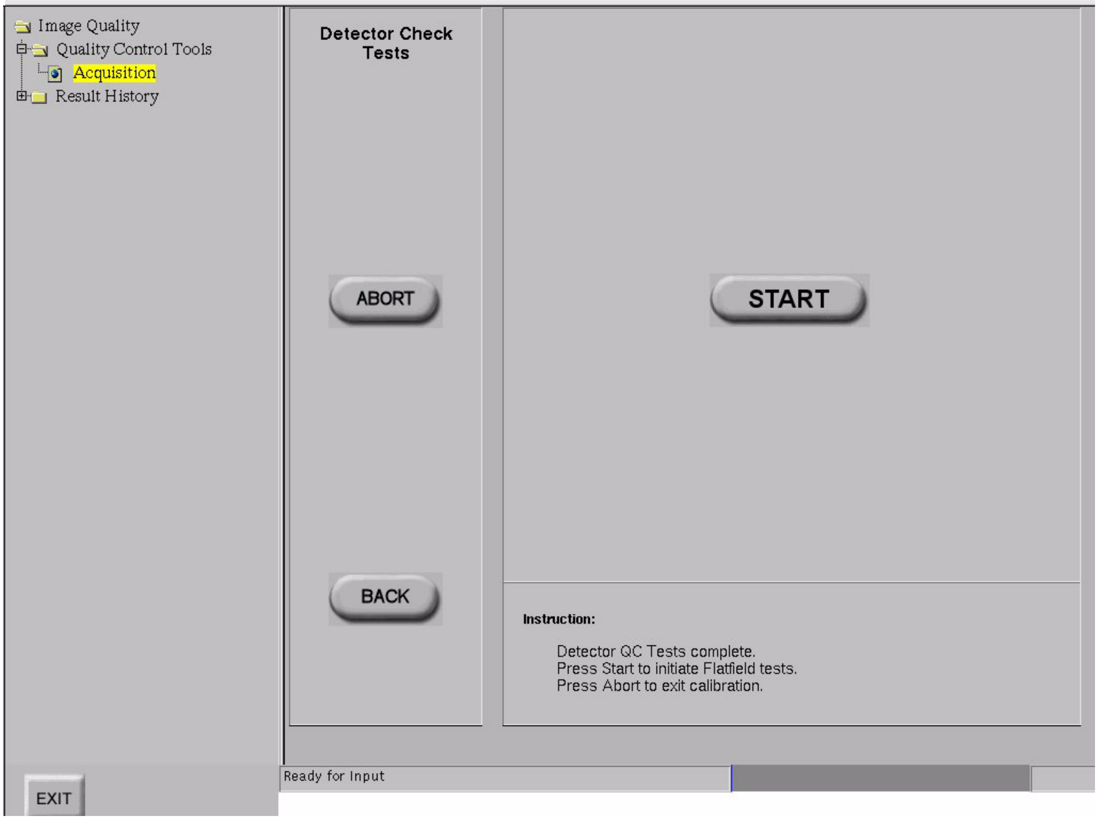


Image Quality
Quality Control Tools
Acquisition
Result History
Detector Check Tests
ABORT
BACK
START
EXIT

Instruction:

Detector QC Tests complete.
Press Start to initiate Flatfield tests.
Press Abort to exit calibration.

Ready for Input

10. Press [start] to begin the Flat-field tests.
    - The Flat-field tests screen appears.

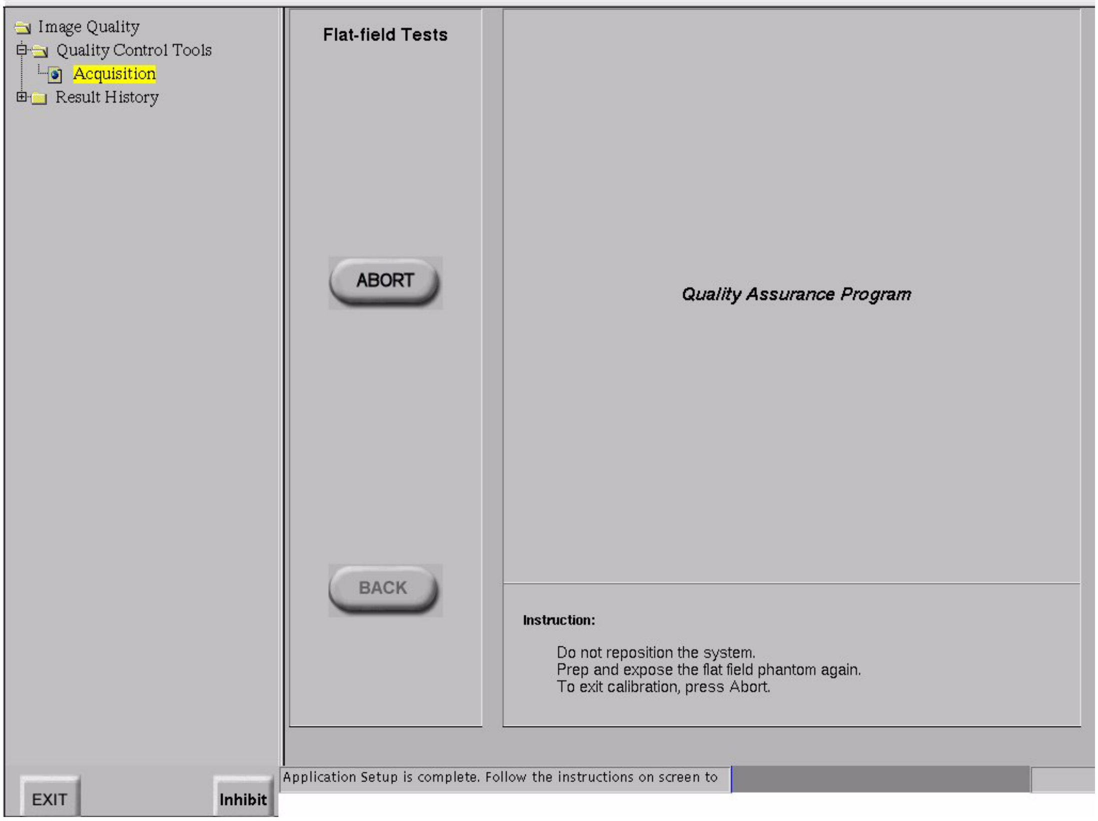


Image Quality
Quality Control Tools
Acquisition
Result History
Flat-field Tests
ABORT
BACK
Quality Assurance Program
EXIT
Inhibit

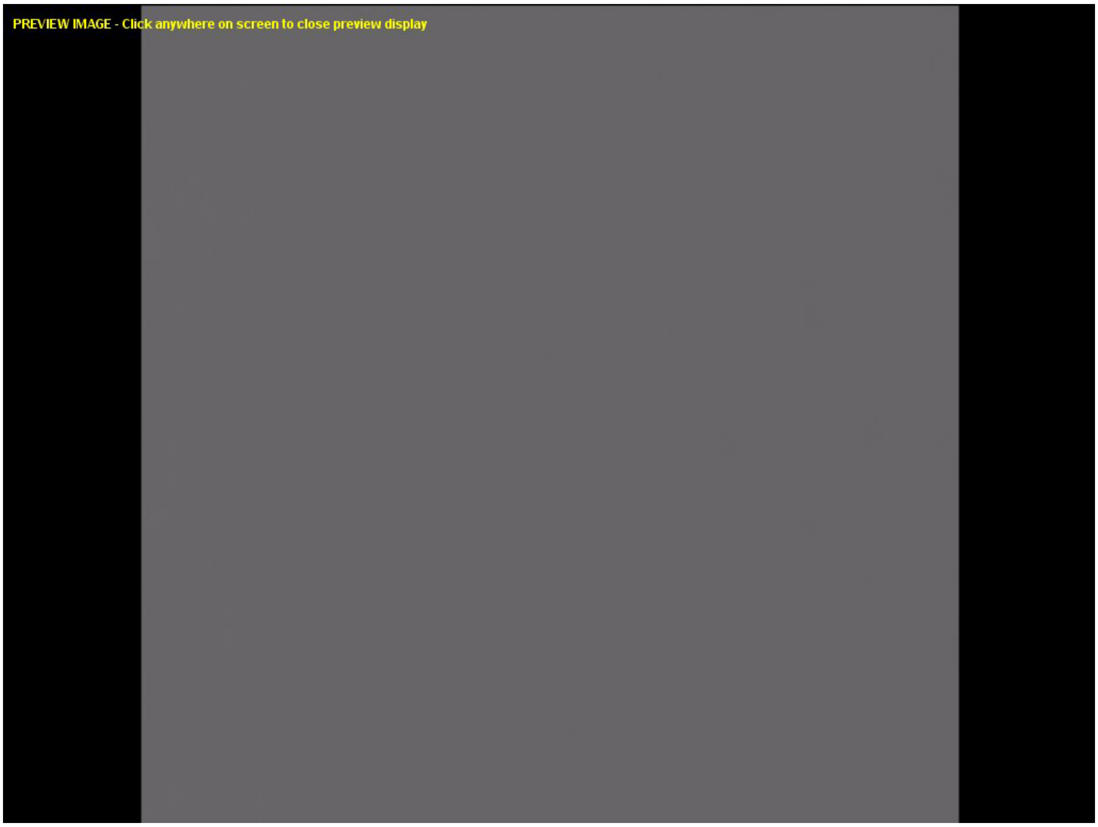
Instruction:

Do not reposition the system.
Prep and expose the flat field phantom again.
To exit calibration, press Abort.

Application Setup is complete. Follow the instructions on screen to

11. Follow the instructions on screen to complete this portion of the test:
    a) Do not reposition the system.
    b) Pre and expose the flat field phantom again.
    c) To exit calibration, press [ABORT].

Figure 13-9 Flat-field acquired image



PREVIEW IMAGE - Click anywhere on screen to close preview display

- The second Flat-field Tests screen appears.

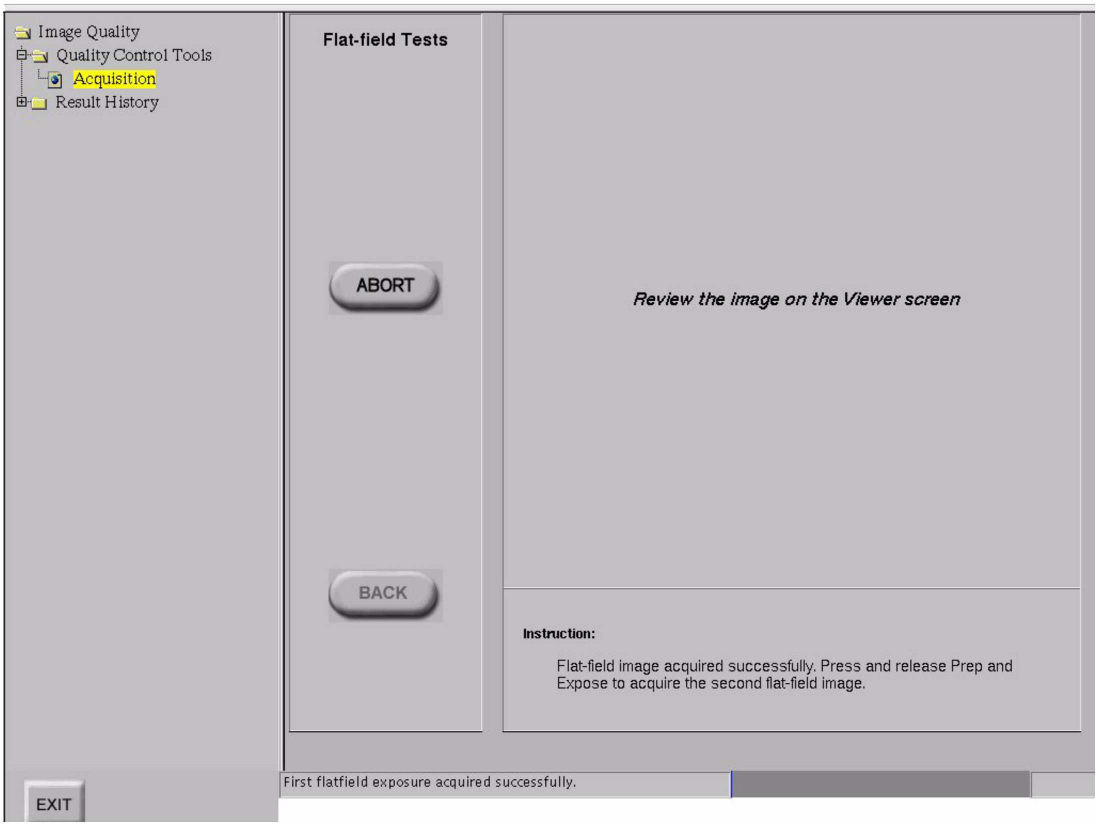


Image Quality
Quality Control Tools
Acquisition
Result History
Flat-field Tests
ABORT
BACK
EXIT

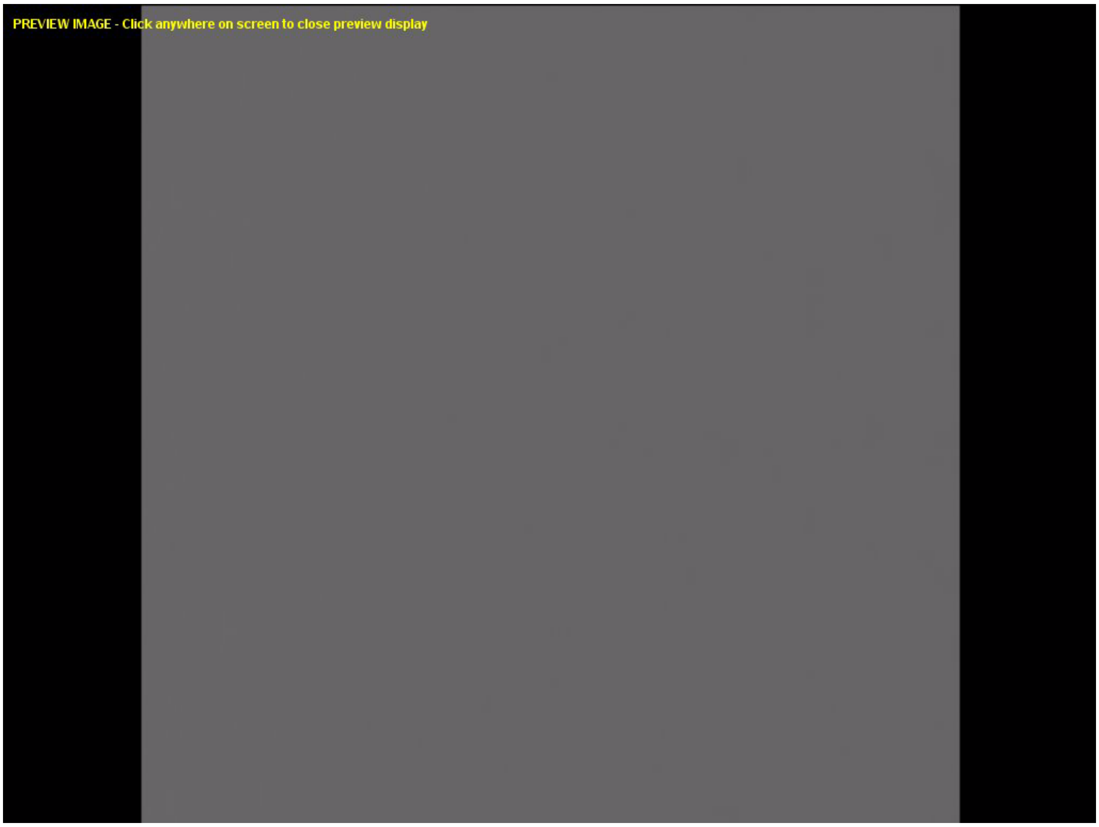
Review the image on the Viewer screen

Instruction:

Flat-field image acquired successfully. Press and release Prep and Expose to acquire the second flat-field image.

First flatfield exposure acquired successfully.

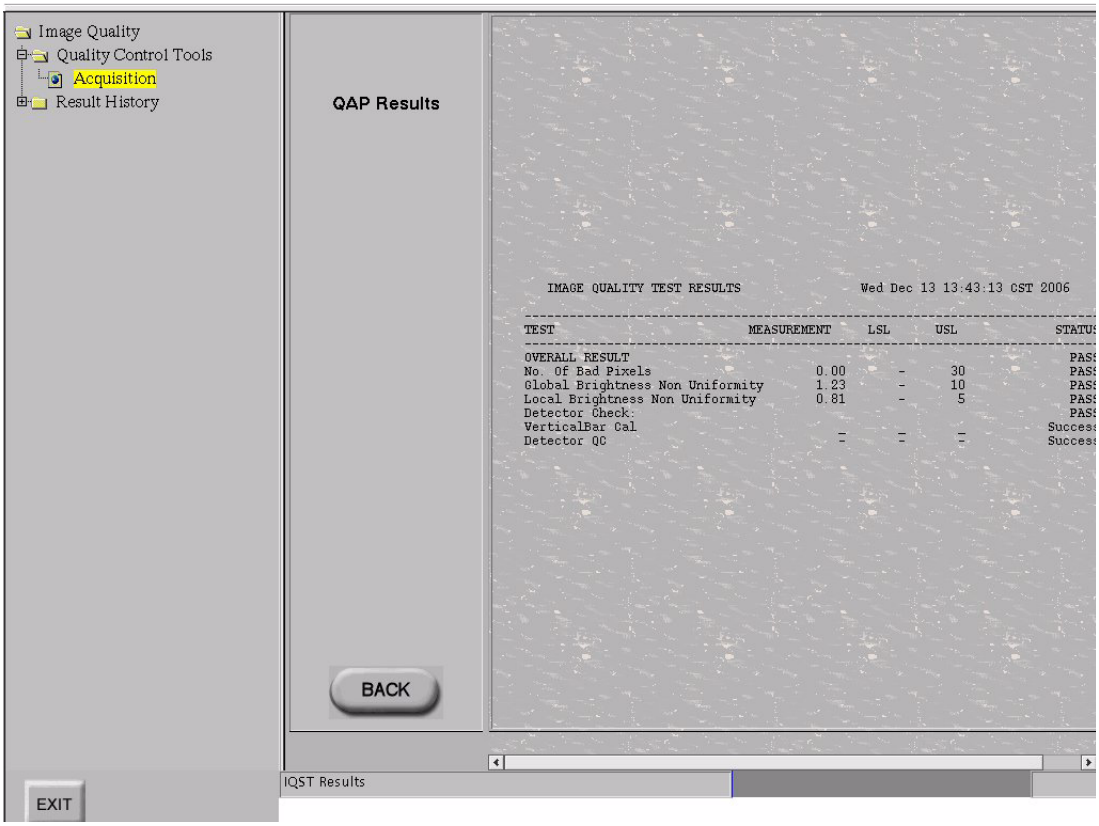
12. Follow the instructions on screen to complete this portion of the test.
    - Flat-field acquired image



PREVIEW IMAGE - Click anywhere on screen to close preview display

13. Click anywhere of the flat-field acquired image to go back to the QAP screen.
    - The Normal-QAP result screen appears automatically after tests have been completed.

Figure 13-10 QAP Results screen



```
  IMAGE QUALITY TEST RESULTS              Wed Dec 13 13:43:13 CST 2006

------------------------------------------------------------------------
TEST                          MEASUREMENT     LSL       USL          STATU
------------------------------------------------------------------------
OVERALL RESULT                                                        PAS
No. Of Bad Pixels                    0.00       -        30           PAS
Global Brightness Non Uniformity     1.23       -        10           PAS
Local Brightness Non Uniformity      0.81       -         5           PAS
Detector Check:                                                       PAS
VerticalBar Cal                                                    Succes
Detector QC                             -       -         -        Succes
```

14. Review the Status (far right column) of each test.
    - If all tests PASS: QAP is complete. Click [EXIT] to return to the Worklist screen and continue work.
    - If some tests FAIL: Refer to *Failed Normal QAP* for more information.

Failed Normal QAP

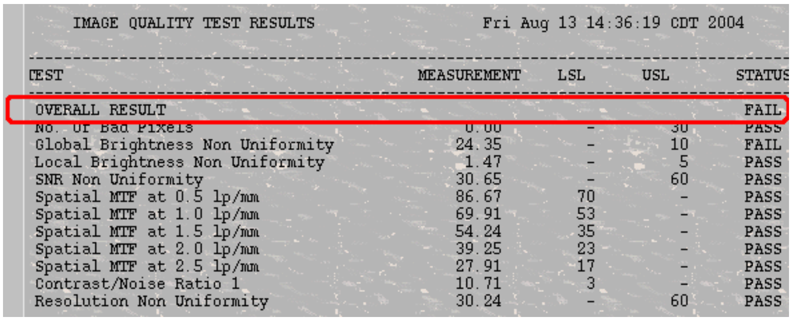
In the event of failed QAP tests, repeat the Normal QAP procedure to confirm the failure. This section identifies common problems to check.

- If the Border check and/or Homogeneity Histogram test fails, check the alignment of the detector to the tube and repeat the test. (Incorrect alignment may cause failure of brightness non-uniformity and bad pixels.)
- Check the collimator blade position and make sure they are fully open; i.e., the collimator blades are not in the field of view.

If a single failure is confirmed, call to schedule service. The system is operational, although inspection and potential calibration are needed.

If multiple failures are confirmed, image quality may be effected; cease use of the unit and call for immediate service.

Figure 13-11 Failed QAP results



```
    IMAGE QUALITY TEST RESULTS                   Fri Aug 13 14:36:19 CDT 2004

--------------------------------------------------------------------------------
TEST                                            MEASUREMENT    LSL       USL      STATUS
--------------------------------------------------------------------------------
 OVERALL RESULT                                                                  FAIL
 No. Of Bad Pixels                                     0.00      -        30     PASS
 Global Brightness Non Uniformity                     24.35      -        10     FAIL
 Local Brightness Non Uniformity                       1.47      -         5     PASS
 SNR Non Uniformity                                   30.65      -        60     PASS
 Spatial MTF at 0.5 lp/mm                             86.67     70         -     PASS
 Spatial MTF at 1.0 lp/mm                             69.91     53         -     PASS
 Spatial MTF at 1.5 lp/mm                             54.24     35         -     PASS
 Spatial MTF at 2.0 lp/mm                             39.25     23         -     PASS
 Spatial MTF at 2.5 lp/mm                             27.91     17         -     PASS
 Contrast/Noise Ratio 1                               10.71      3         -     PASS
 Resolution Non Uniformity                            30.24      -        60     PASS
```

Result History

After Normal QAP is complete, the system generates a test summary page. The result summary table contains descriptive names, measured values, test specifications (LSL and/or USL) and pass/fail status.

A minimum of 25 Normal QAP test results are maintained.

Follow this process to view the results of previous Normal QAP tests.

1. From the left pane, press [RESULT HISTORY].
    - The Result History screen appears.
2. Press a test entry in the list to select it.
3. Press [SELECT].
    - The test details appear.

Figure 13-12 QAP Result History screen

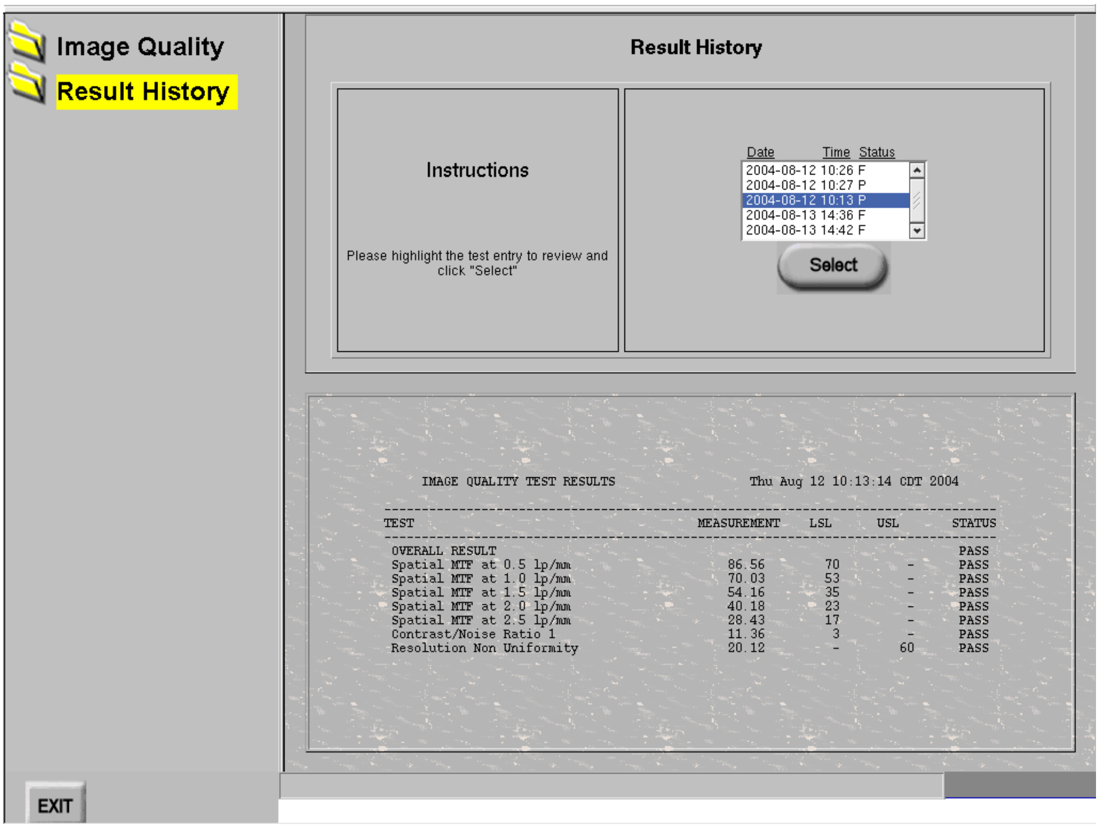


Image Quality
Result History
Result History
Instructions
Select
EXIT

Please highlight the test entry to review and click "Select"

Date	Time	Status
2004-08-12	10:26	F
2004-08-12	10:27	P
2004-08-12	10:13	P
2004-08-13	14:36	F
2004-08-13	14:42	F

```
    IMAGE QUALITY TEST RESULTS                  Thu Aug 12 10:13:14 CDT 2004

-------------------------------------------------------------------------------
TEST                                 MEASUREMENT   LSL      USL        STATUS
-------------------------------------------------------------------------------
 OVERALL RESULT                                                        PASS
 Spatial MTF at 0.5 lp/mm               86.56       70        -        PASS
 Spatial MTF at 1.0 lp/mm               70.03       53        -        PASS
 Spatial MTF at 1.5 lp/mm               54.16       35        -        PASS
 Spatial MTF at 2.0 lp/mm               40.18       23        -        PASS
 Spatial MTF at 2.5 lp/mm               28.43       17        -        PASS
 Contrast/Noise Ratio 1                 11.36        3        -        PASS
 Resolution Non Uniformity              20.12        -       60        PASS
```

Chapter 14

Maintenance

It is the owners responsibility to provide regular periodic maintenance and service. Only this type of maintenance program can identify potential problems.

Topics covered include:

- *Periodic Maintenance*
- *Qualified Service*
- *Cleaning and Disinfecting*
- *Recycling*

Periodic Maintenance

Periodic maintenance is required for continued SAFE operation. Periodic maintenance should be performed as specified in the maintenance schedule of the service manual by qualified personnel. Descriptions and scheduled frequency of the required periodic maintenance are provided in the Service manual (# 5255600-2EN) supplied with the equipment. Inspection intervals are based on average daily use of one eight hour shift.

These periodic maintenance procedures will be performed by GE service if contracted to do so. Generally, most of the parts need maintenances once a year; general cleaning and painting as required; Replace NonVolatile RAM on the kV Control Board every 8 years. More frequent inspection is appropriate where equipment use is above average.

CAUTION: **Failure to perform the periodic inspection and maintenance could allow deteriorating conditions to develop without being detected. This deterioration could result in equipment failures, which could cause serious injury or equipment damage.**

Qualified Service

Safe equipment performance requires the use of service personnel specially trained on medical X-ray apparatus. General Electric Medical Systems and its associates, maintain a world-wide organization of stations from which to furnish periodic and/or emergency service on a contract basis. A GE representative will be glad to discuss this plan. General Electric Medical Systems X-ray equipment contains operating safeguards designed to provide maximum safety. Before calling for service, be certain proper operating procedures are being used.

Cleaning and Disinfecting

This equipment should be cleaned frequently, particularly if corroding chemicals are present. Use a cloth moistened in warm soapy water (use mild soap) to clean the trim and nameplate of the Operator's Controls. Wipe with a cloth moistened in clean water. Do not use cleaners or solvents of any kind as they may dull the finish or blur the lettering. Polish with a pure liquid or paste wax. Other surfaces of the equipment can be cleaned using a clean cloth moistened slightly with a good mild cleaner and polish acceptable for use on enameled metal surfaces. Before each use, equipment surfaces that contact the patient should be cleaned with an EPA registered, low-level disinfection or sanitizing agent.

CAUTION: **In the event of equipment contacting broken skin or being used with infected or immune compromised patients, the equipment should be cleaned using EPA cleared and EPA registered high-level disinfecting agents.**

NOTE: Be sure to follow the label instructions and pre-cautions for use, storage, and disposal of all disinfecting agents.

Recycling

Packing Materials

The materials used to pack our equipment are recyclable. They must be collected and processed in accordance with the regulations in force for the country where the machines or accessories are unpacked.

Machines or Accessories at end-of-life

The elimination of machines and accessories must be in accordance with national regulations for waste processing. All materials and components that could pose a risk to the environment must be removed from the machines at end-of-life and accessories (examples: dry and wet cell batteries, transformer oil, etc.).

Please consult your local GEHC representative before discarding these products.

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Chapter 15

Set Preferences

Preferences will allow a super-user to customize your system for your facilities needs. It will allow you to predefine your X-ray procedure parameters so that any stored procedure may be retrieved from memory. This will allow you to access technique factors programmed for that type of procedure. This chapter explains the Preferences available to you, and how to activate or change the preferences for your facility.

This chapter explains how to set the preferences for various features on your system. You can enable several automatic networking and printing features, customize your system default annotations, image orientation and preferences for image processing. You are also able to save commonly used operator and physician names in your system for later recall.

This section presents the concepts necessary to successfully build and edit preset procedures to customize your system.

Preferences are set on the Utilities screen (Figure 15-1), which is accessed by clicking the [UTILITIES] button on the Worklist.

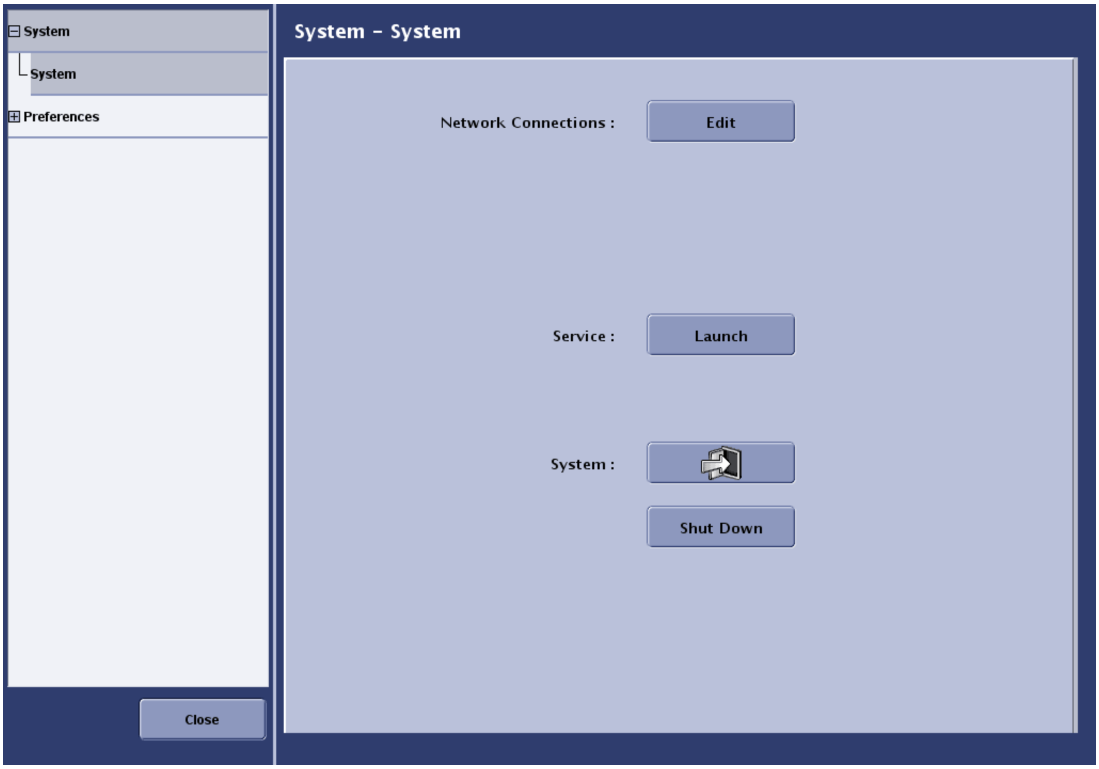
Topics covered include:

- *System*
  - *Network Connections*
  - *Printers*
- *Worklist*
  - *Default Query*
  - *Preset Names*
- *Image Management*
  - *Copy Exam*
  - *Auto Tag (Quality Check)*
  - *Auto Print*
  - *Auto Send (Auto Push)*
  - *Auto Delete*
- *Viewer Pre-set Annotations*
  - *Pre-set Annotations*
- *DEI (Detector Exposure Indicator)*
  - *Change the DEI Display*
  - *Change the Lower and Upper Limits*
  - *Enable or Disable Technical Mode*
  - *Export the DEI Log*
- *Image Processing*
  - *Build Custom Looks*
  - *Change Default Factory Looks for Exams*
  - *Tissue Equalization Overview*
- *Protocols*
  - *Backup Protocol Database to CD*
  - *Retrieve Protocol Database from CD*
  - *Edit Protocol Database*
  - *Protocol Editor Copy Functions*

System

This section provides instructions for setting your system preferences for network and printer connections. The Services Desktop and log off and Shut Down functions are also available from this screen. Refer to *Chapter 5: General Information* for more information about logging off and Shut Down.

Figure 15-1 System Utilities screen


System
System
Preferences
Close
System - System
Network Connections :
Edit
Service :
Launch
System :
Shut Down

Network Connections

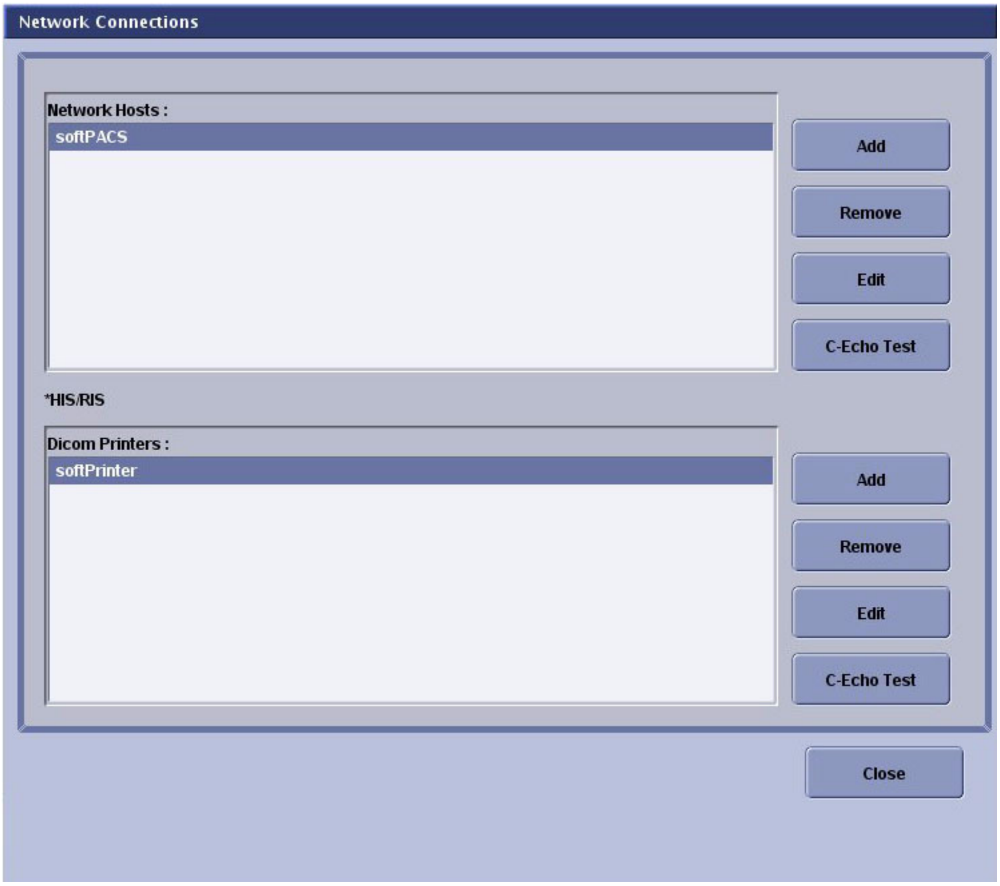
Network and printer connections are configured through the Utilities System-System screen. This screen allows qualified service personnel to define the Digital Imaging and COmmunication in Medicine (DICOM) send destinations.

Network connections may be added, removed, or edited from this screen.

Follow this process to access the Network Connections screen.

1. On the Worklist screen, click [UTILITIES].
    - The System-System screen appears.
2. Click [NETWORK CONNECTIONS].
    - The Network Connections screen (Figure 15-2) appears.

Figure 15-2 Network Connections screen


Network Connections
Network Hosts :
softPACS
Add
Remove
Edit
C-Echo Test
*HIS/RIS
Dicom Printers :
softPrinter
Add
Remove
Edit
C-Echo Test
Close

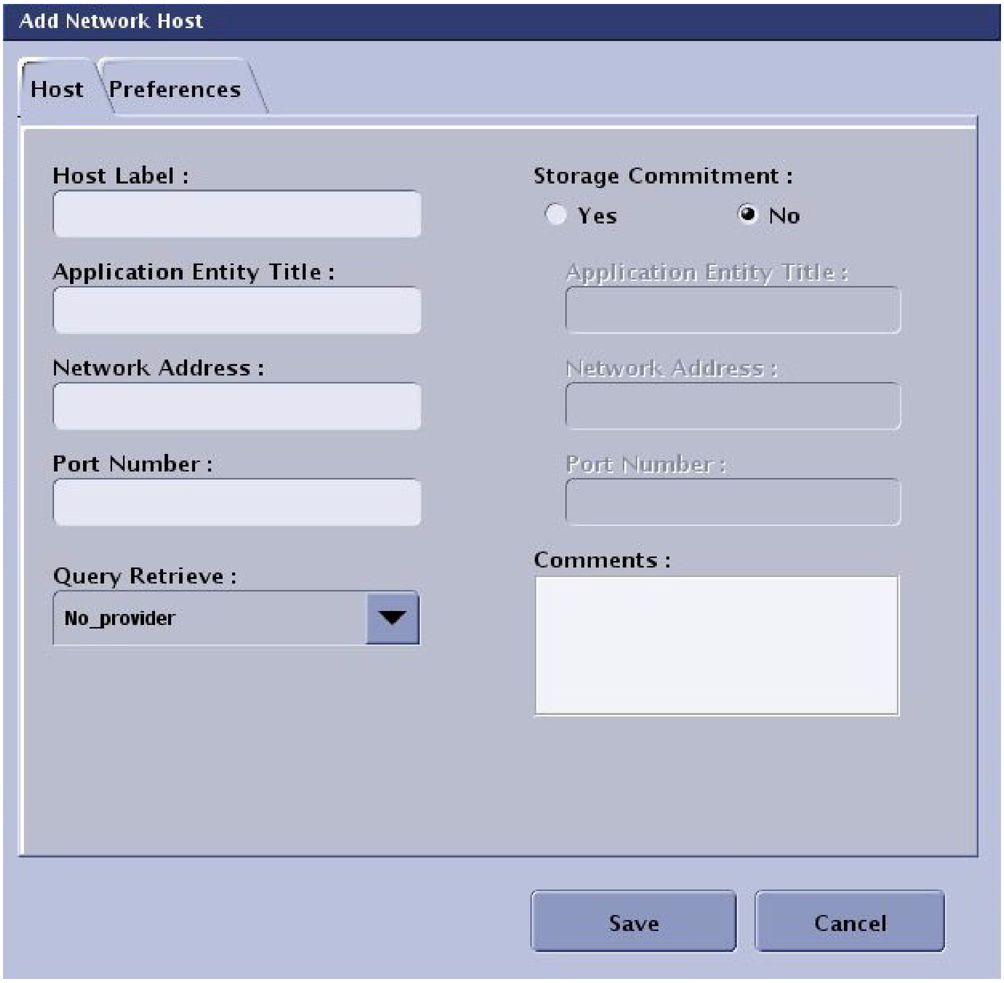
Add or Edit Network Host

Adding and editing network hosts use very similar process and the same screens as shown in Figure 15-3 and Figure 15-4. Table 15-2 and Table 15-3 describe the fields in detail.

- If editing an existing connection, select the network host and click [EDIT].
- If adding a new connection, click [ADD].

Complete requested information for both tabs and click [SAVE] to add the network host or save the changes.

Figure 15-3 Add Network Host – Host tab


Add Network Host
Host
Preferences
Host Label :
Application Entity Title :
Network Address :
Port Number :
Query Retrieve :
Storage Commitment :
Yes
No
Application Entity Title :
Network Address :
Port Number :
Comments :
Save
Cancel

Storage Commitment : ○ Yes ● No

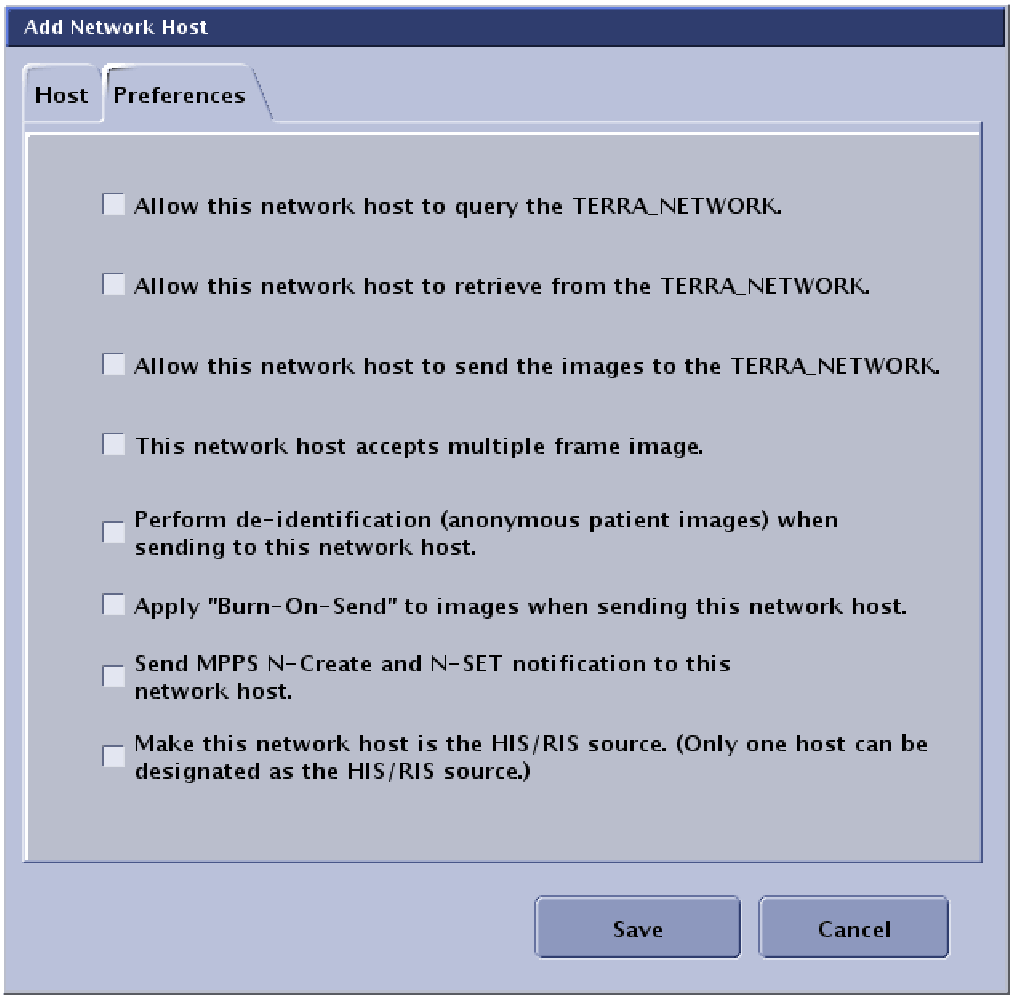
Query Retrieve : No_provider

Table 15-2 Add Network Host – Hosts tab description

Function	Description
Host Label	The name of the host that appears in the Network Hosts lists and on the Image Management screen. **NOTE:** Host labels cannot have spaces in the name. Use underscores (_) to separate words.
Application Entry Title	Type in **DICOM AE**.
IP Address	The IP address of the network host.
Port Number	The port number for the network host.

Function	Description
Query Retrieve	Sets the type of information the host will provide on query from another host. Available options are: • No provider • Study • Patient
Storage Commitment	Designates if the host will store image data.
Storage Commitment - Application Entry Title	Type in **DICOM AE**.
Storage Commitment -IP Address	The IP address of the storage database.
Storage Commitment -Port Number	The port number of the storage database.
Comments	Allows you to add notes about the network host or configuration.

Figure 15-4 Add Network – Preferences tab



☐ Allow this network host to query the TERRA_NETWORK.

☐ Allow this network host to retrieve from the TERRA_NETWORK.

☐ Allow this network host to send the images to the TERRA_NETWORK.

☐ This network host accepts multiple frame image.

☐ Perform de-identification (anonymous patient images) when sending to this network host.

☐ Apply "Burn-On-Send" to images when sending this network host.

☐ Send MPPS N-Create and N-SET notification to this network host.

☐ Make this network host is the HIS/RIS source. (Only one host can be designated as the HIS/RIS source.)

Table 15-3 Add Network Host – Preferences tab description

Function	Description
Allow this host to query the (Definium 6000 system name)	Allows this host to search and filter the Definium 6000 system.
Allow this host to retrieve from the (Definium 6000 system name)	Allows this host to open and display exams from the Definium 6000 system.
Allow this host to send images to the (Definium 6000 system name)	Allows the host to send images to the Definium 6000 system.

Function	Description
This network host accepts multiple frame image.	Allows multiple frame images to be send to this network host.
Perform de-identification (anonymous patient images) when sending to this network host.	Automatically de-identifies any images that the Definium 6000 system sends to this host. Refer to *Chapter 8: Image Management-Make Patient Anonymous* for more information about de-identification.
Apply "Burn-On-Send" to images when sending to this network host.	Burns the VOI LUT (Look-Up Tables) into the DICOM header to be displayed by PACS. Leaving his option unselected sends all available VOI LUTs to the DICOM header for PACS to query and apply. **NOTE:** PACS should be configured to read the first VOI LUT for proper display of images on the Acquisition workstation.
Send MPPS N-Create and N-Set notification to this network host.	This node acts as the Destination for receiving the MPPS N-Create & N-Set Notification. When configured for MPPS, the System sends information like which exam is in progress, when a Study is completed, how many images were acquired, and what was the radiation dose to which the patient was exposed during that session, etc.
Make this host the HIS/RIS source. (Only one host can be designated as the HIS/RIS source.)	Designates the host as the DICOM worklist provider. Defining the Radiology Information System (RIS) and Hospital Information System (HIS) host allows you to download patient worklists from those networks to your system. **NOTE:** Only one HIS/RIS source may be designated on the system. Selecting this option will de-select any other hosts as the HIS/RIS source.

Remove

Follow this process to remove a network host.

1. From the Network Connections screen, select the network host.
2. Click [REMOVE].
    - A message appears: "Are you sure you want to remove (host name)?"

3. Click [YES].
   - [CANCEL] closes the message and returns you to the Network Connections screen without removing the connection.
   - The network host is removed.

Perform C-Echo Test

Use this function when you want to check to see if the system is communicating with a particular network host.

1. Select a host from the Network Hosts list.
2. Press [C-ECHO TEST].
   - A message appears to notify you if the test passed or failed.
   - A "passed" message means that the network host is working and that you can retrieve exams from it or transfer exams to it.

Failed C-Echo Test

A "failed" message means that the system could not contact the network host.

Perform the following tasks to resolve the problem.

- Re-try the test at a later time. The host may be temporarily unavailable.
- Confirm the host configuration on the Edit screen.

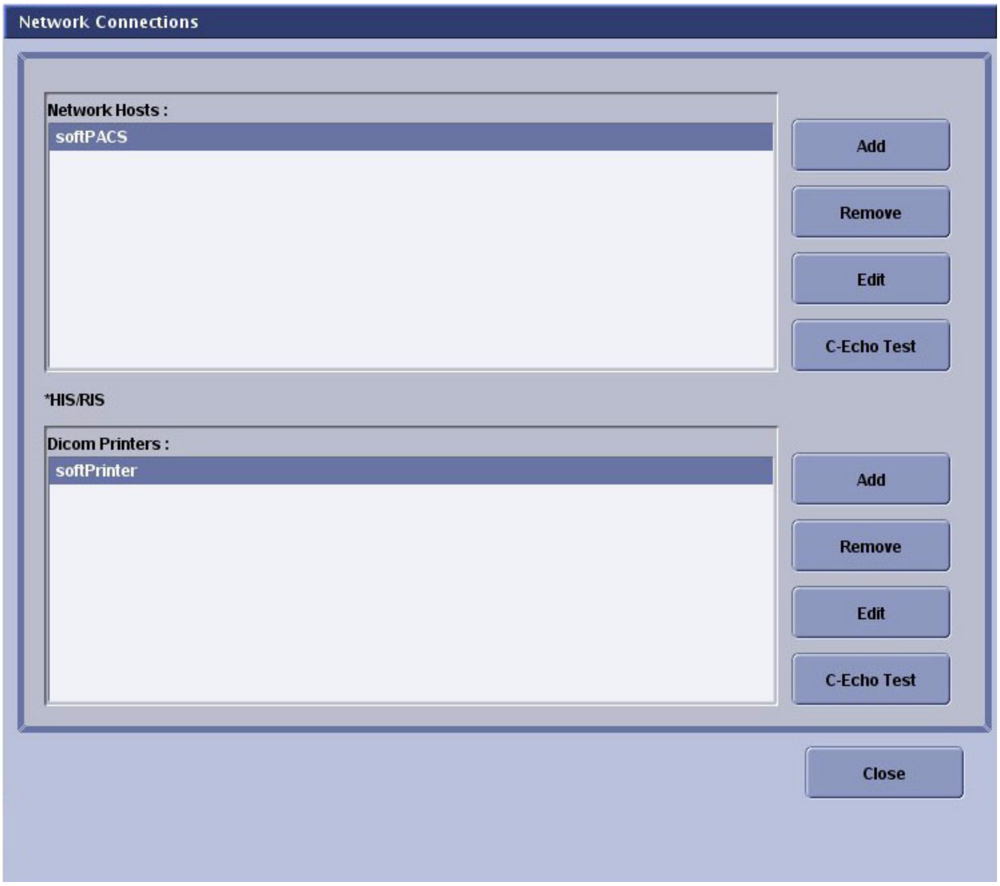
If the problem persists, contact your technical support group or system administrator.

Printers

Follow this process to access the Network Connections screen.

1. On the Worklist screen, click [UTILITIES].
   - The System-System screen appears.
2. Click [NETWORK CONNECTIONS].
   - The Network Connections screen (Figure 15-5) appears.

Figure 15-5 Network Connections screen


Network Connections
Network Hosts :
softPACS
Add
Remove
Edit
C-Echo Test
*HIS/RIS
Dicom Printers :
softPrinter
Add
Remove
Edit
C-Echo Test
Close

Add or Edit DICOM Printers

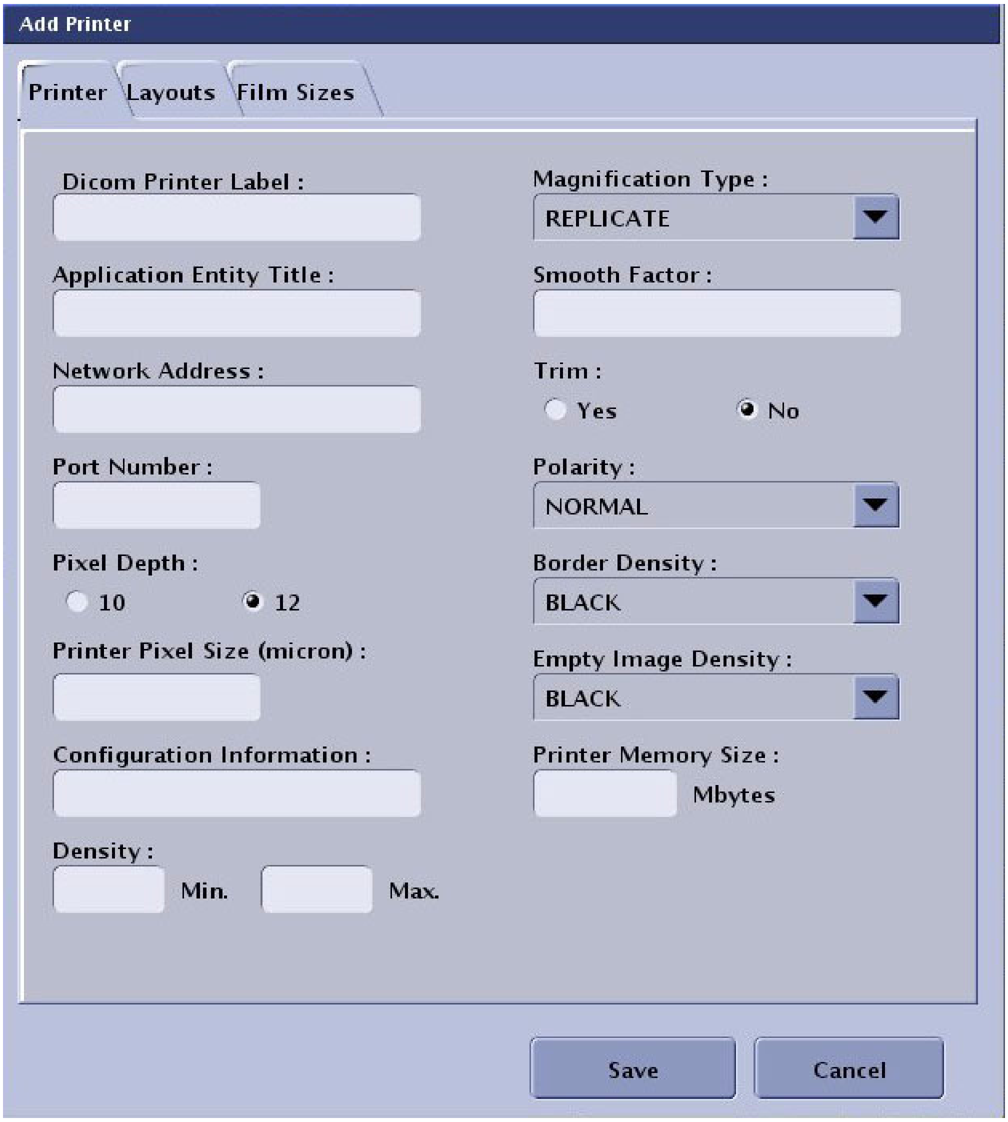
Adding and editing printers use very similar process and the same screens shown in Figure 15-6, Figure 15-7, and Figure 15-8. Table 15-4, Table 15-5, and Table 15-6 describe the fields in detail.

- If Editing an existing printer's configuration, select the printer from the DICOM Printers list and click [EDIT].
- If adding a new printer, click [ADD].

Complete requested information for all tabs and click [SAVE] to add the printer or save the changes.

NOTE: All printers on system must have a printer calibratin performed by service for each individual printer to assure IQ.

Figure 15-6 Add Printer screen – Printer Tab


Add Printer
Printer
Layouts
Film Sizes
Dicom Printer Label :
Application Entity Title :
Network Address :
Port Number :
Printer Pixel Size (micron) :
Configuration Information :
Density :
Min.
Max.
Smooth Factor :
Printer Memory Size :
Mbytes
Save
Cancel

Pixel Depth : ○ 10 ● 12

Magnification Type : REPLICATE

Trim : ○ Yes ● No

Polarity : NORMAL

Border Density : BLACK

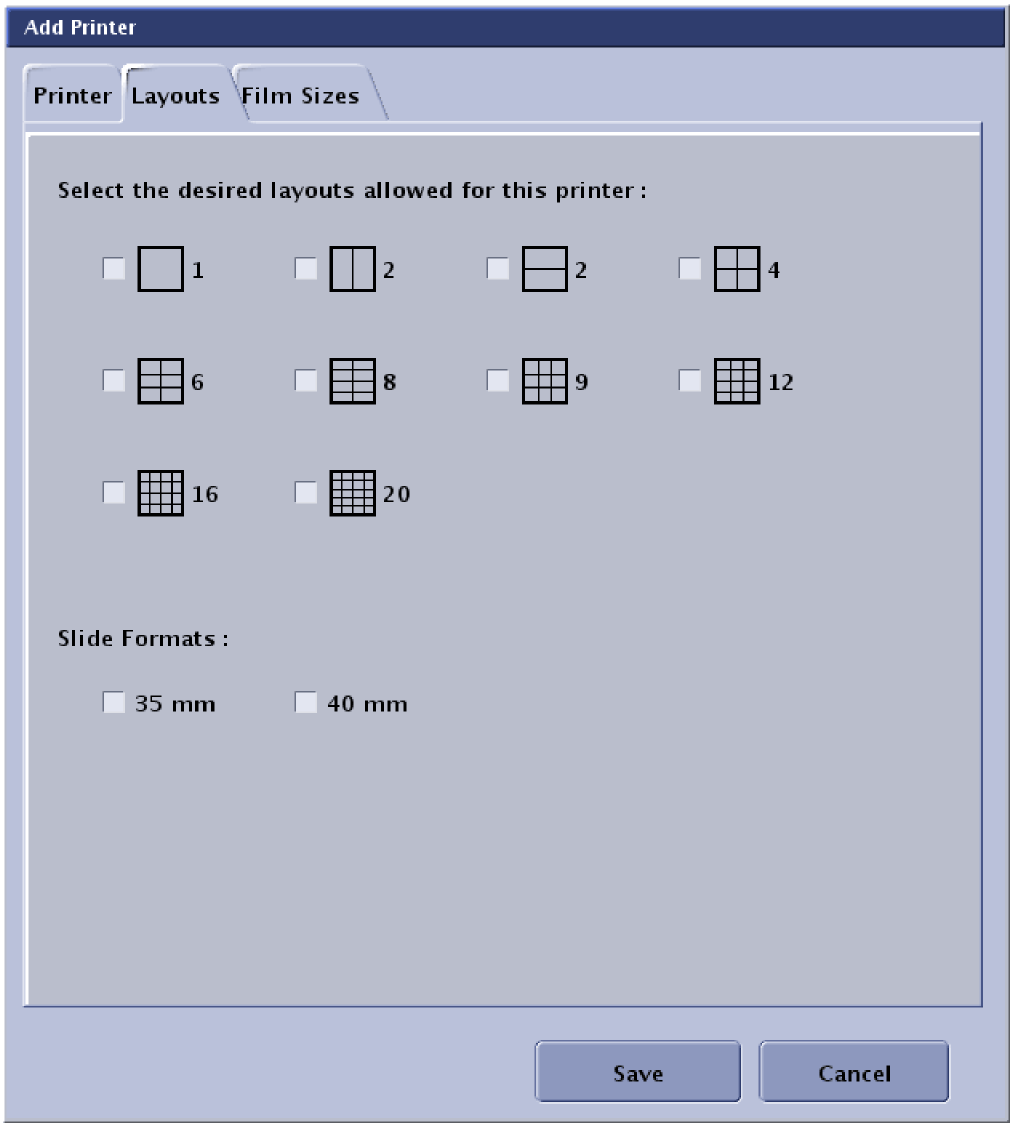
Empty Image Density : BLACK

Table 15-4 Add Printer screen– Printer Tab description

Function	Description
DICOM Printer Label	The name of the printer that appears in the DICOM Printers list and on the print setup screens. **NOTE:** DICOM printer labels cannot have spaces in the name. Use underscores (_) to separate words.
Application Entry Title	Type in **DICOM AE**

Function	Description
IP Address	The IP address of the printer.
Port Number	The port number of the printer.
Pixel Depth	The resolution of the printer.
Printer Pixel Size (micron)	Designates the pixel size the printer uses. This is specified by the printer manufacturer.
Configuration Information	A place for you to add notes about the printer or configuration.
Density	Available options are: • Min • Max
Magnification Type	Available options are: • Replicate • Bilinear • Cubic • None
Smooth Factor	Sets the image smoothing factor.
Trim	Designates if there is to be trim or not.
Polarity	Available options are: • Normal • Reverse
Border Density	Sets the color of the image border. Available options are: • Black • White
Empty Image Density	Sets the color of areas that have no image printed. Available options are: • Black • White
Printer Memory Size	Designates the memory size of the printer. This is specified by the printer manufacturer.

Figure 15-7 Add Printer screen – Layouts tab



Select the desired layouts allowed for this printer :

☐ 1 ☐ 2 ☐ 2 ☐ 4

☐ 6 ☐ 8 ☐ 9 ☐ 12

☐ 16 ☐ 20

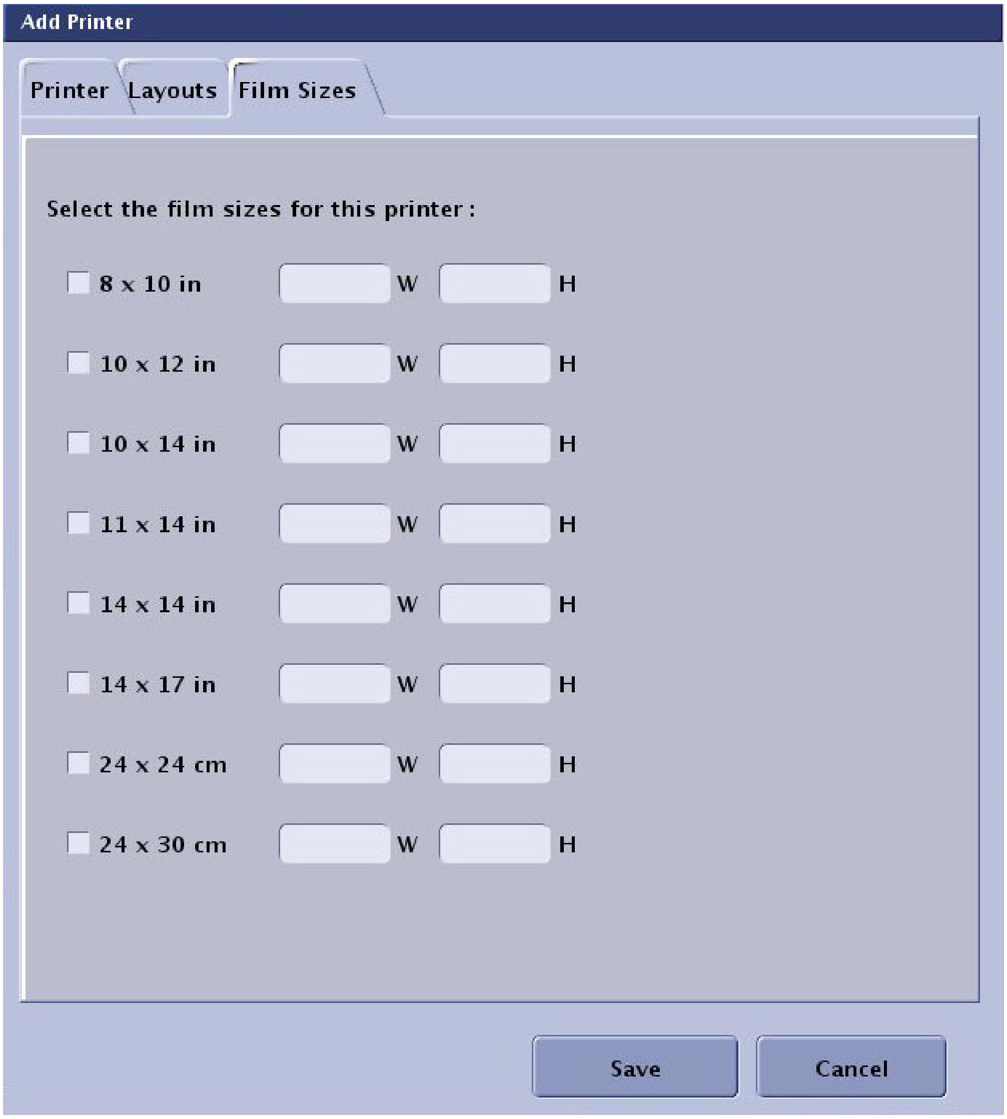
Slide Formats :

☐ 35 mm ☐ 40 mm

Table 15-5 Add Printer screen– Layouts Tab description

Function	Description
Select the desired layouts allowed for this printer	Selections allow the number of images that may be printed on a single sheet of film or paper. Some selections control the orientation of the images on the page: for example, 2 images per page may be side by side or one on top of the other.
Slide formats	Selections allow the side formats available for the printer, if any.

Figure 15-8 Add Printer – Film Sizes tab



Select the film sizes for this printer :

☐ 8 x 10 in W H
☐ 10 x 12 in W H
☐ 10 x 14 in W H
☐ 11 x 14 in W H
☐ 14 x 14 in W H
☐ 14 x 17 in W H
☐ 24 x 24 cm W H
☐ 24 x 30 cm W H

Table 15-6 Add Printer screen– Film sizes description

Function	Description
Film sizes (8 x 10in)	Selects the sizes of film available for the printer.
Pixel size: W (width)	Sets how wide the film is in pixels. This value is provided by the printer manufacturer based on what the printer supports.

Function	Description
Pixel size: H (height)	Sets how high the film is in pixels. This value is provided by the printer manufacturer based on what the printer supports.

Remove

Follow this process to remove a printer.

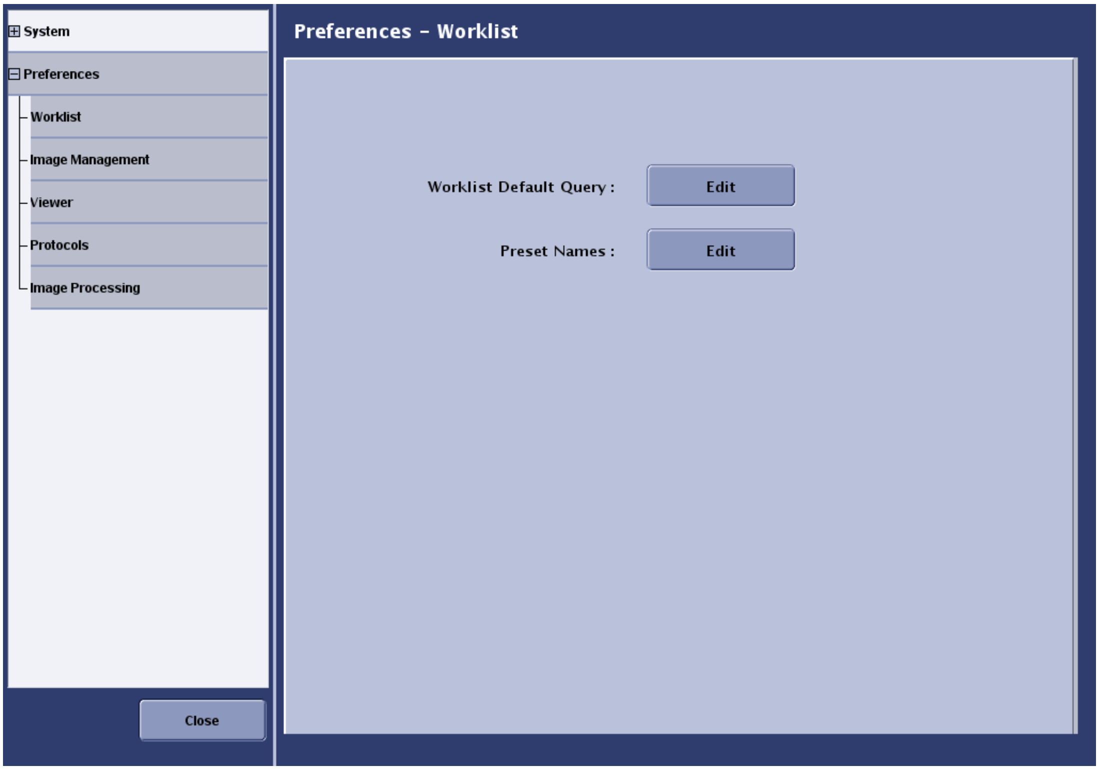
1. From the Network Connections screen, select the printer.
2. Click [REMOVE].
    - A message appears: “Are you sure you want to remove (printer name)?”
3. Click [YES].
    - [CANCEL] closes the message and returns you to the Network Connections screen without removing the connection.
    - The printer is removed.

Worklist

Worklist preferences are available from the Utilities screen.

1. On the Worklist screen, click [UTILTIES].
2. Select **Preferences > Worklist**.

Figure 15-9 Preferences – Worklist screen

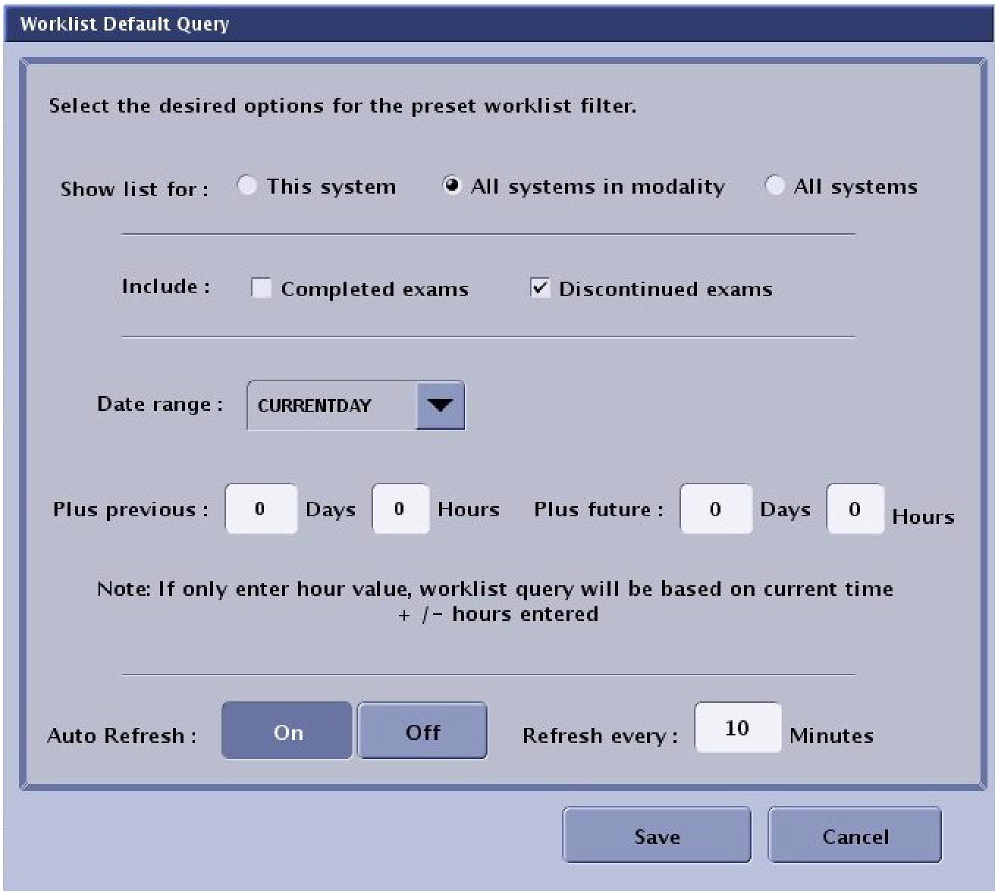

System
Preferences
Worklist
Image Management
Viewer
Protocols
Image Processing
Close
Preferences – Worklist
Worklist Default Query :
Edit
Preset Names :
Edit

Default Query

The Worklist Default Query controls the amount of HIS/RIS information that appears on the Worklist and allows you to enable and configure the auto-refresh function.

1. Complete or edit the Worklist Default Query screen (Figure 15-10). Table 15-7 describes the fields in detail.
2. Click [SAVE] to change the Default Query.

Figure 15-10 Worklist Default Query screen



Select the desired options for the preset worklist filter.

Show list for : ○ This system ● All systems in modality ○ All systems

Include : ☐ Completed exams ☑ Discontinued exams

Date range : CURRENTDAY

Plus previous : 0 Days 0 Hours Plus future : 0 Days 0 Hours

Note: If only enter hour value, worklist query will be based on current time + /- hours entered

Auto Refresh : On Off Refresh every : 10 Minutes

Table 15-7 Worklist Default Query description

Function	Description
Show list for	Determines Worklist items by system or modality. • This system – the local workstation • All systems in modality – all digital x-ray systems in the network • All systems – all imaging systems in the network
Include	Allows you to include or exclude completed or cancelled exams on the Worklist.

Function	Description
Date Range	Selects the date range of scheduled procedures to show on the Worklist. Options are: • All • Current Day
Plus previous __ Days __ Hours	Shows procedures that are scheduled for the specified time before the selected date range.
Plus future __ Days __ Hours	Shows procedures that are scheduled for the specified time after the selected date range.
Auto Refresh [ON] [OFF]	Turns Auto Refresh on or off.
Refresh every __ Minutes	If Auto Refresh is [ON], sets how often (in minutes) the worklist refreshes. The interval may be between 1 and 9999 minutes.

Auto Refresh

The Worklist Auto-Refresh feature automatically refreshes the Patient Worklist at predefined time intervals.

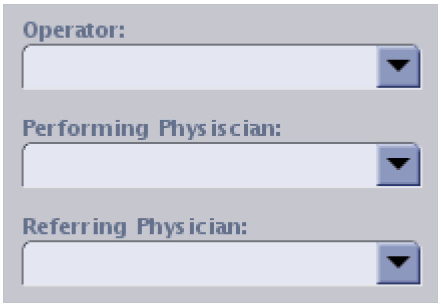
NOTE: You will not be able to make selections or access Worklist functions while the worklist is refreshing.

NOTE: For large facilities, it is recommended that the auto refresh interval be set to a short time, for example, every 1 or 2 minutes. The system will refresh more often, but each refresh will take less time to complete.

Preset Names

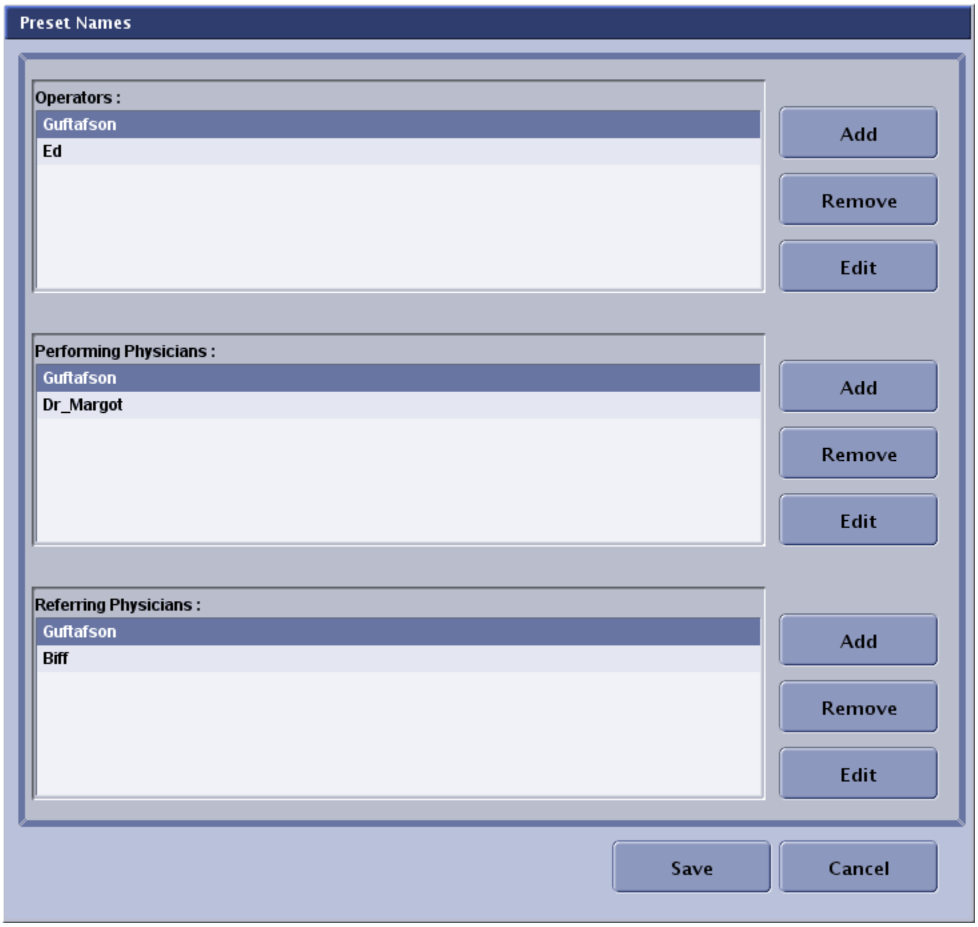
The Preset Names screen (Figure 15-12) allows you to add, remove, or edit the names that appear on the Add Patient/Patient Information screen's Operators, Performing Physicians, and Referring Physicians drop-down lists (Figure 15-11).

Figure 15-11 Drop-down lists on the Add Patient screen


Operator:
Performing Physician:
Referring Physician:

1. Follow the procedures below to Add, Edit, or Remove Preset Names.
2. When finished, click [SAVE] to retain the changes you made.

Figure 15-12 Preset Names screen


Preset Names

Operators :
Guftafson
Ed

Performing Physicians :
Guftafson
Dr_Margot

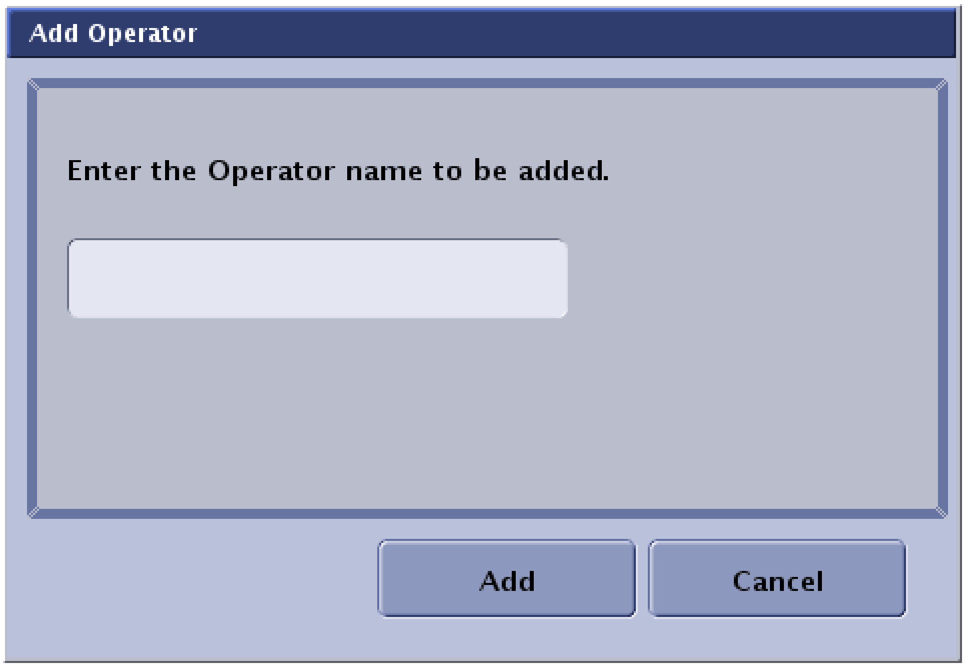
Referring Physicians :
Guftafson
Biff

Add
Remove
Edit
Add
Remove
Edit
Add
Remove
Edit
Save
Cancel

Add Preset Names

1. Click [ADD] for the appropriate group.
2. Type the name to add.

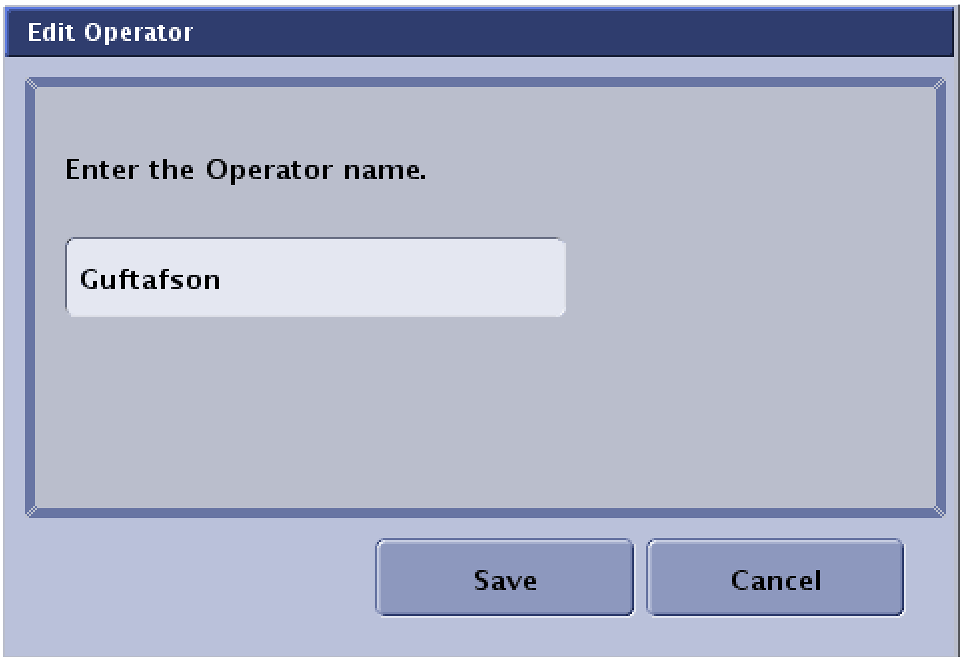
3. Click [ADD].


Add Operator
Add
Cancel

Enter the Operator name to be added.

Edit Preset Names

1. Select the name to change.
2. Click [EDIT] for the group.
3. Edit the name as appropriate.
4. Click [SAVE].

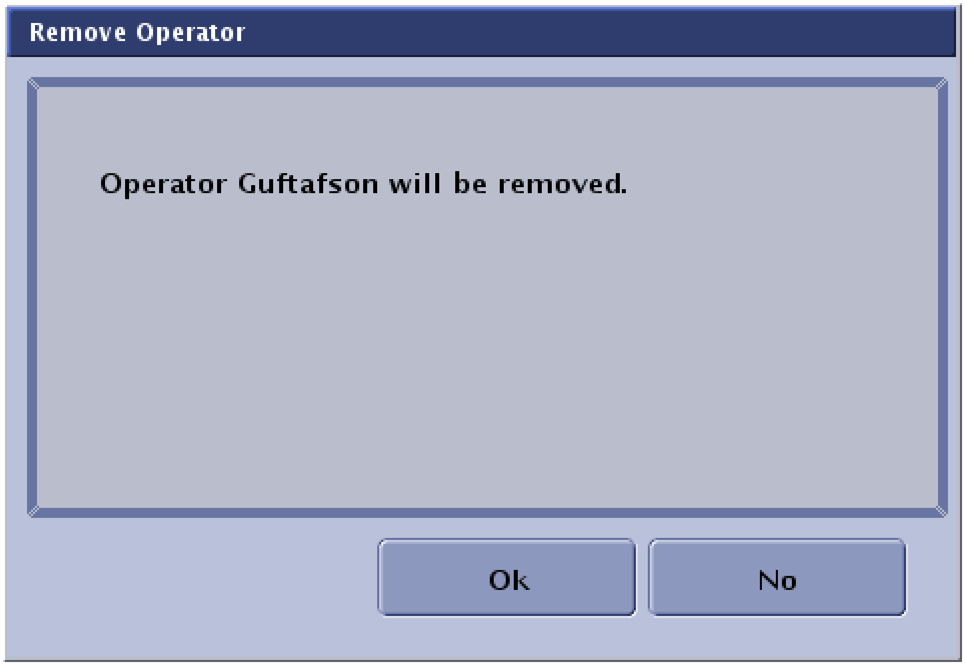

Edit Operator
Save
Cancel

Enter the Operator name.

Guftafson

Remove Preset Names

1. Select the name to remove.
2. Click [REMOVE] for the group.
3. Click [OK] to remove the name.
    - Click [NO] to keep the name.



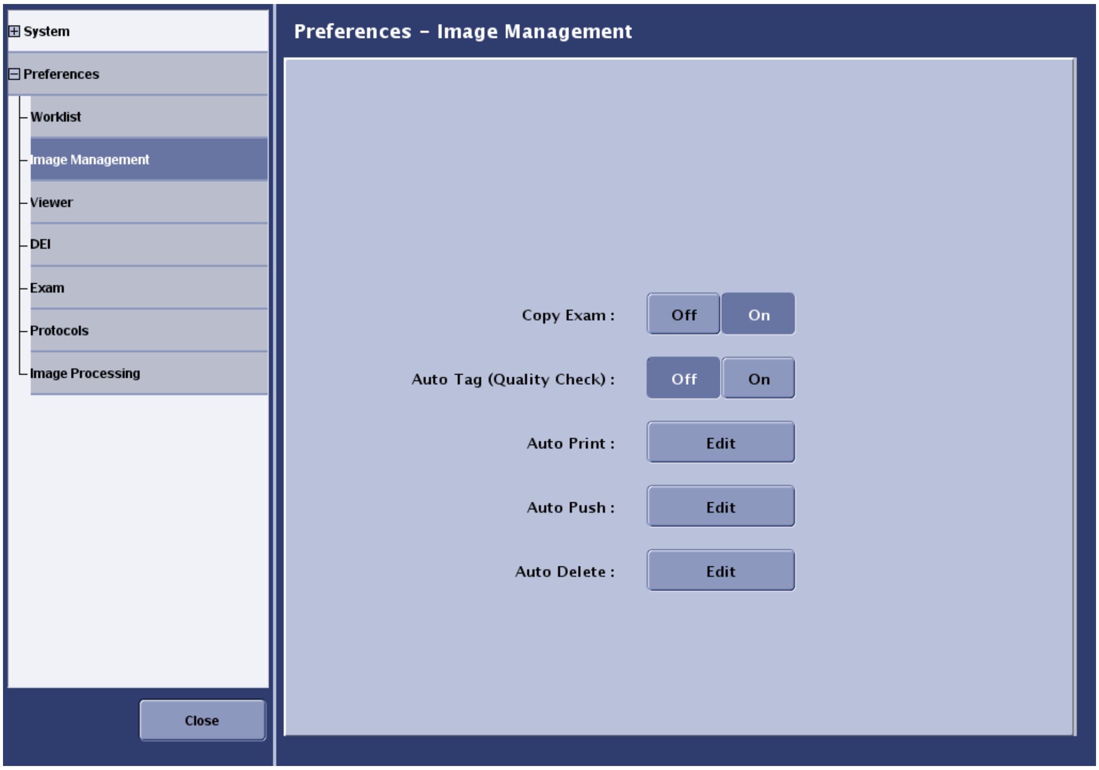
Remove Operator

Operator Guftafson will be removed.

Image Management

Image Management preferences allow you to enable and configure the Copy Exam, Auto Tag, Auto Print, Auto Push, and Auto Delete functions.

Figure 15-13 Preferences – Image Management


System
Preferences
Worklist
Image Management
Viewer
DEI
Exam
Protocols
Image Processing
Close
Preferences – Image Management
Copy Exam : Off On
Auto Tag (Quality Check) : Off On
Auto Print : Edit
Auto Push : Edit
Auto Delete : Edit

Copy Exam

Default: ON.

Enabling the Copy Exam function allows exams to be copied between the local databases and network hosts. It also allows exams to be copied to a CD.

There is no configuration for this function; it is either enabled (ON) or disabled (OFF).

Follow this process to enable or disable Copy Exam:

1. From the Worklist screen, click [UTILITIES].
2. Select **Preferences > Image Management**.
3. Click Copy Exam [ON] to enable the function.
    - Copy Exam [OFF] disables the function.
4. Click [CLOSE].

Auto Tag (Quality Check)

Default: OFF.

Enabling Auto Tag (or Quality Check) provides an indicator on the Image Viewer screen to mark an image of acceptable quality. Auto Print and Auto Delete can be configured to act upon images that have the Quality Check mark.

There is no configuration for this function; it is either enabled (ON) or disabled (OFF).

Follow this process to enable or disable Auto Tag:

1. From the Worklist screen, click [UTILITIES].
2. Select **Preferences > Image Management**.
3. Click Auto Tag [ON] to enable the function.
   - Auto Tag [OFF] disables the function.
4. Click [CLOSE].

Auto Print

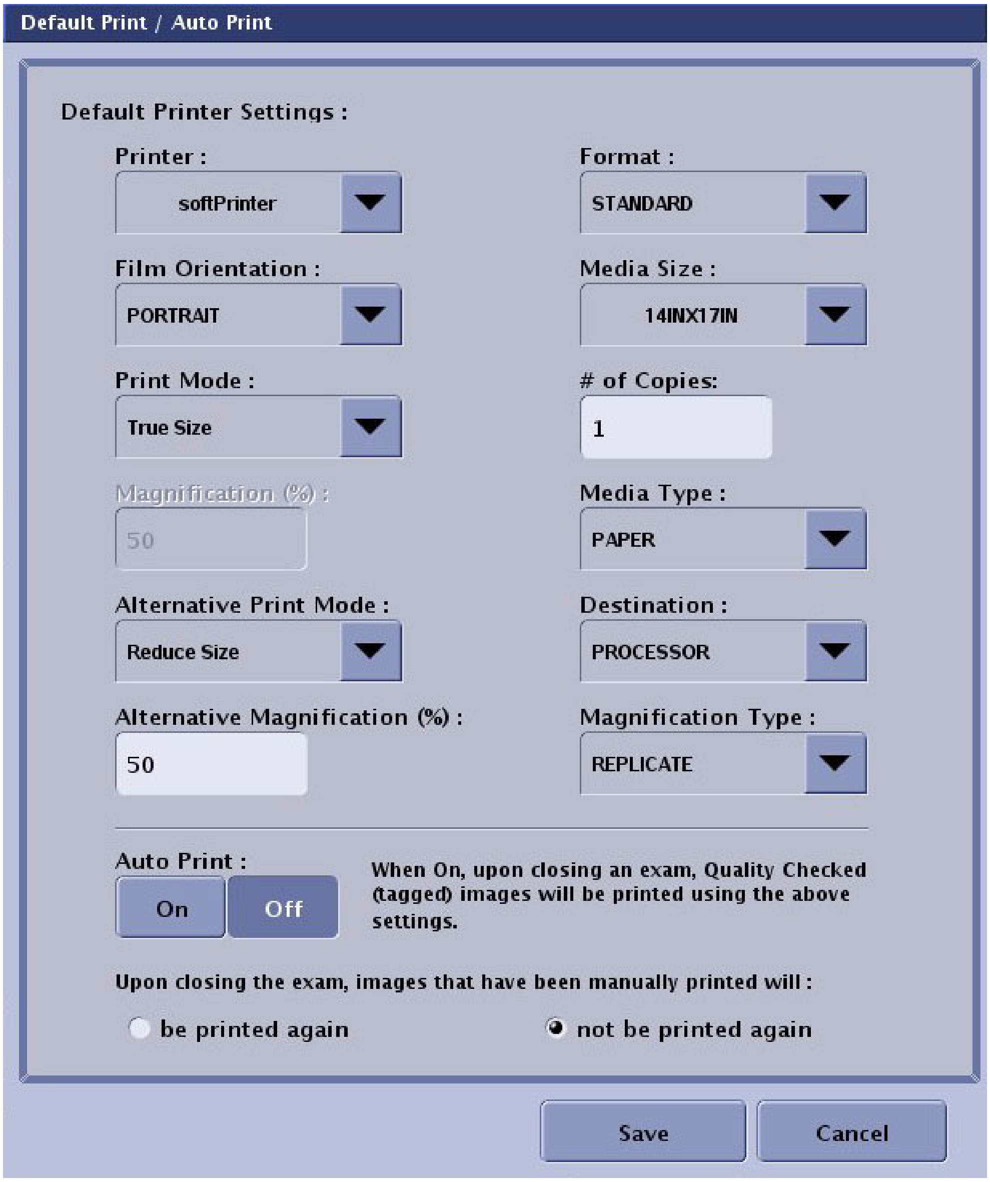
Default Print/Auto Print (Figure 15-14) allows you to configure your printer parameters. This is done so that you do not need to select all the parameters each time you print an image.

You can select a primary and alternative location as well as how many copies you want each time you print.

Follow this process to configure Auto Print.

1. From the Worklist screen, click [UTILITIES].
2. Select **Preferences > Image Management**.
3. Click Auto Print [EDIT].
   - The Default Print/Auto Print screen appears.
4. Complete the information as described in Table 15-8.
5. When finished, click [SAVE] to retain your changes.
6. Click [CLOSE].

Figure 15-14 Auto Print



Default Print / Auto Print

Default Printer Settings :

Printer : softPrinter

Format : STANDARD

Film Orientation : PORTRAIT

Media Size : 14INX17IN

Print Mode : True Size

# of Copies: 1

Magnification (%) : 50

Media Type : PAPER

Alternative Print Mode : Reduce Size

Destination : PROCESSOR

Alternative Magnification (%) : 50

Magnification Type : REPLICATE

Auto Print : On | Off

When On, upon closing an exam, Quality Checked (tagged) images will be printed using the above settings.

Upon closing the exam, images that have been manually printed will :

○ be printed again ● not be printed again

Table 15-8 Auto Print Functions

Function	Description
Printer	Lists the printers and laser cameras connected to your system.

Function	Description
Film Orientation	Sets if the image will print on the film horizontally or vertically. Available options are: • Portrait – vertical film orientation • Landscape – horizontal film orientation • Auto – selects the best film orientation for the image
Print Mode	Provides options on the size of the image data printed. Available options are: • True Size • Fit to Film • Fit + • Reduced Size
Magnification (%)	Allows you to enter an image reduction factor. The allowable range is 40-90%. This text box is active only if you select the Reduced Size print mode.
Alternate Print mode	Allows you to choose a second print destination so if the primary destination is down, the images go to the secondary choice.
Alternative Magnification (%)	Allows you to enter an image reduction factor for the secondary printer.
Format	Allows you to choose the formats available for the selected printer. Available options are: • Standard • Slide • Superslide
Media Size	Allows you to choose the size of the media available for the selected printer.
Number of Copies	The Number of Copies text box lets you type in the number of films you wish to print ranging from one to nine. The default is one.

Function	Description
Media Type	Allows you to choose the media types available for the selected printer. Available options are: • Paper • Clear Film • Blue Film
Destination	Allows you to choose the destinations available for the selected printer. Available options are: • Processor • Magazine
Magnification Type	Allows you to choose the magnification types available for the selected printer. Available options are: • Replicate • Bilinear • Cubic • None
Auto Print [ON] [OFF]	If Auto Tag is enabled, turning Auto Print [ON] will automatically print all images that have the Auto Tag mark when the Image Viewer screen is closed. [OFF] disables the Auto Print function.
Upon closing the exam...	Allows the choice to automatically re-print or to not print any images that were printed manually from the Image Viewer screen.
[SAVE]	Saves the current selections and values as the default printing configuration.
[CANCEL]	Closes the Auto Print screen without saving your changes.

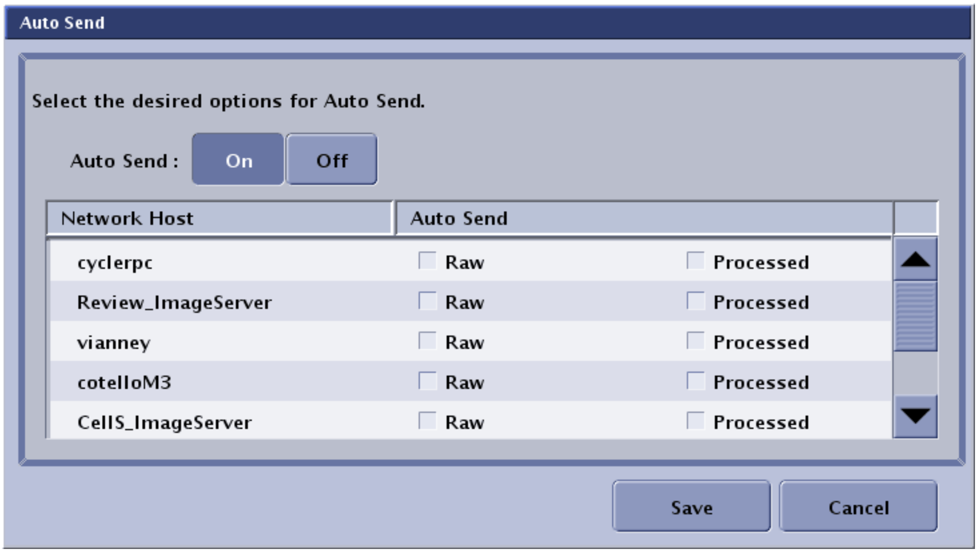
Auto Send (Auto Push)

Auto Send automatically transfers images to another network device when the exam is closed. Auto Send is enabled and configured from the Utilities – Preferences screen.

Follow this process to configure Auto Send.

1. From the Worklist screen, click [UTILITIES].
2. Select **Preferences > Image Management**.
3. Click Auto Push [EDIT].
    - The Auto Send screen appears.
4. Complete the information as described in Table 15-9.
5. When finished, click [SAVE] to retain your changes.
6. Click [CLOSE].

Figure 15-15 Auto Send



Select the desired options for Auto Send.

Auto Send : On Off

Network Host	Auto Send	
cyclerpc	☐ Raw	☐ Processed
Review_ImageServer	☐ Raw	☐ Processed
vianney	☐ Raw	☐ Processed
cotelloM3	☐ Raw	☐ Processed
CellS_ImageServer	☐ Raw	☐ Processed

Table 15-9 Auto Send Functions

Function	Description
Auto Auto [ON] [OFF]	Turns Auto Send on or off. Selecting On allows you to configure the default Auto Send settings.
Network Host column	Lists the available network locations where images may be transferred. Refer to *Network Connections* for information about how to configure the available Network Hosts.
Auto Send column	Allows you to choose which images are sent to each network host. You may choose either Raw or Processed, both, or none. Leaving both choices unselected means that no images will be sent to the network host.

Function	Description
[SAVE]	Saves your selections as the default settings and closes the Auto Send screen.
[CANCEL]	Closes the screen without saving your changes.

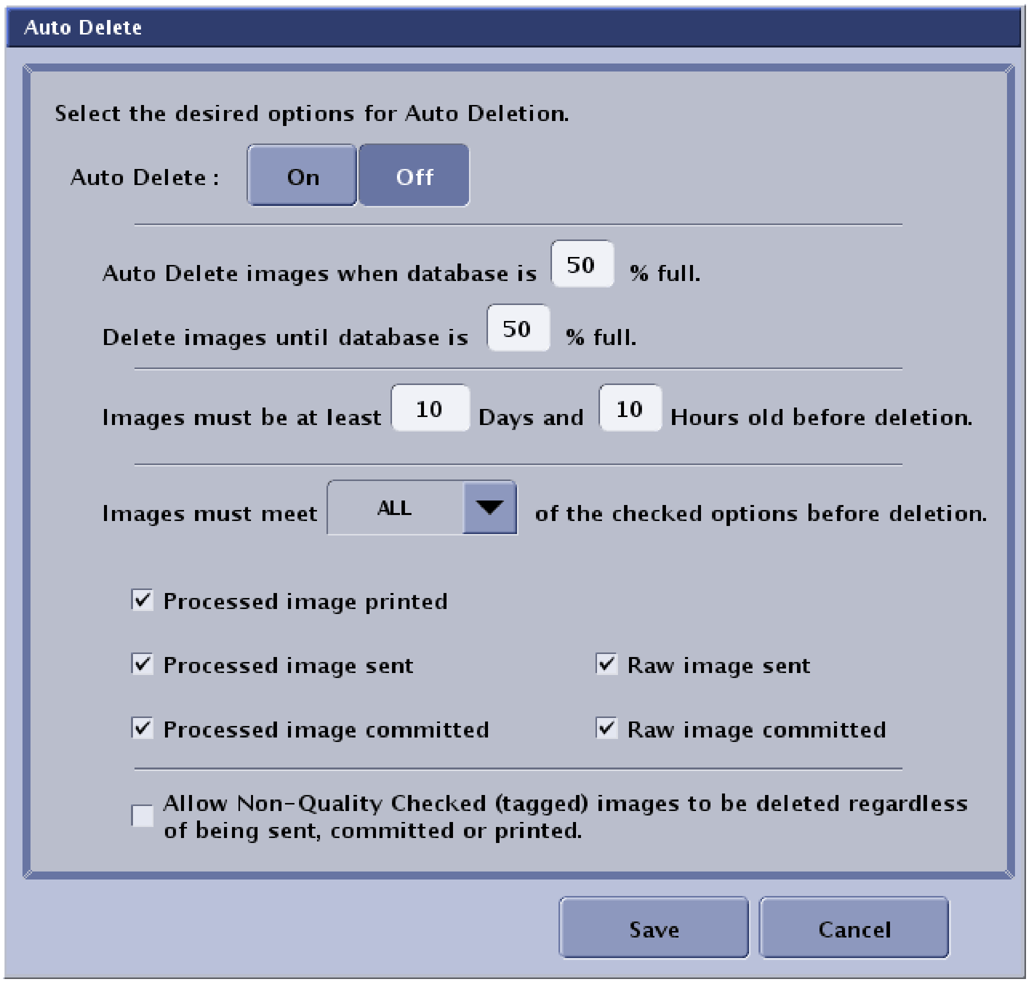
Auto Delete

Auto Delete automatically deletes images when the image database does not have enough space. Auto Delete is enabled from the Utilities – Preferences screen.

Follow this process to configure Auto Delete.

1. From the Worklist screen, click [UTILITIES].
2. Select **Preferences > Image Management**.
3. Click Auto Delete [EDIT].
   - The Auto Delete screen appears.
4. Complete the information as described in Table 15-10.
5. When finished, click [SAVE] to retain your changes.
6. Click [CLOSE].

Figure 15-16 Auto Delete



Auto Delete

Select the desired options for Auto Deletion.

Auto Delete :

Auto Delete images when database is 50 % full.

Delete images until database is 50 % full.

Images must be at least 10 Days and 10 Hours old before deletion.

Images must meet ALL of the checked options before deletion.

☑ Processed image printed

☑ Processed image sent ☑ Raw image sent

☑ Processed image committed ☑ Raw image committed

☐ Allow Non-Quality Checked (tagged) images to be deleted regardless of being sent, committed or printed.

Table 15-10 Auto Delete functions

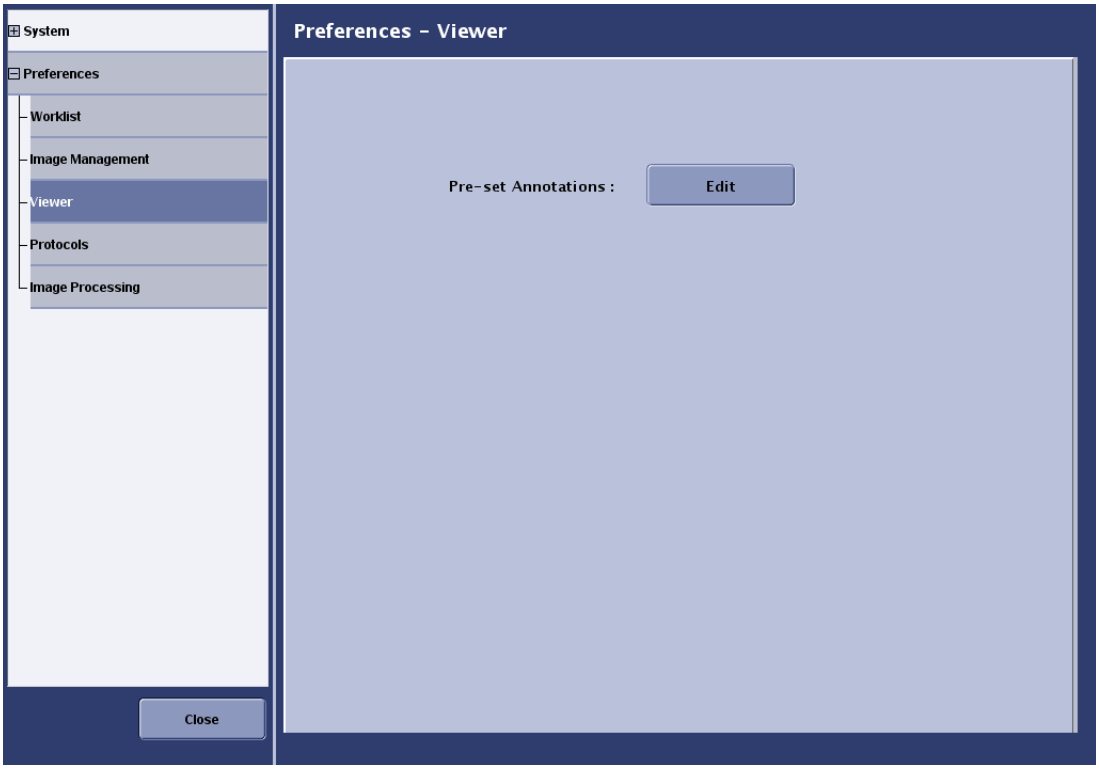
Function	Description
Auto Delete [ON] [OFF]	Turns Auto Delete on or off.
Auto Delete images when database is __% full.	Specifies when to auto delete images based on database size.
Delete images until database is __% full.	Specifies how many images to delete based on database size.

Function	Description
Images must be at least __ Days and __ Hours old before deletion.	Specifies how old (in days and hours) an image must be for it to be deleted. Images that are less than the entered number will not be deleted.
Images must meet __ of the checked options before deletion.	Allows you to constrain the deletion of raw and processed images based upon checkbox selection.
Processed image printed	Selecting the Print parameter allows auto deletion of images that have been printed.
Processed image sent	Allows auto deletion of processed images with no errors that have been sent to another viewing station.
Raw image sent	Allows auto deletion of raw images with no errors that have been sent to another viewing station.
Processed image committed	Allows auto deletion of processed images that have been sent to a long term device with storage commitment capability. Storage commitment for a network host is configured from the System – System screen, Network Connections.
Raw image committed	Allows auto deletion of raw images that have been sent to a long term device with storage commitment capability.
Allow Non-Quality Checked (tagged) images to be deleted...	Allows auto deletion of any images that have the Auto Tag (Quality Check) mark. **NOTE:** If any of the images in the series do not have the Auto Tag (Quality Check) mark (therefore not sent or printed), the series will not auto delete.
[SAVE]	Saves your changes and closes the screen.
[CANCEL]	Closes the screen without saving changes.

Viewer Pre-set Annotations

Viewer Preferences allow you to add, edit, or remove pre-set annotations.

Figure 15-17 Preferences - Viewer screen


System
Preferences
Worklist
Image Management
Viewer
Protocols
Image Processing
Close
Preferences – Viewer
Pre-set Annotations :
Edit

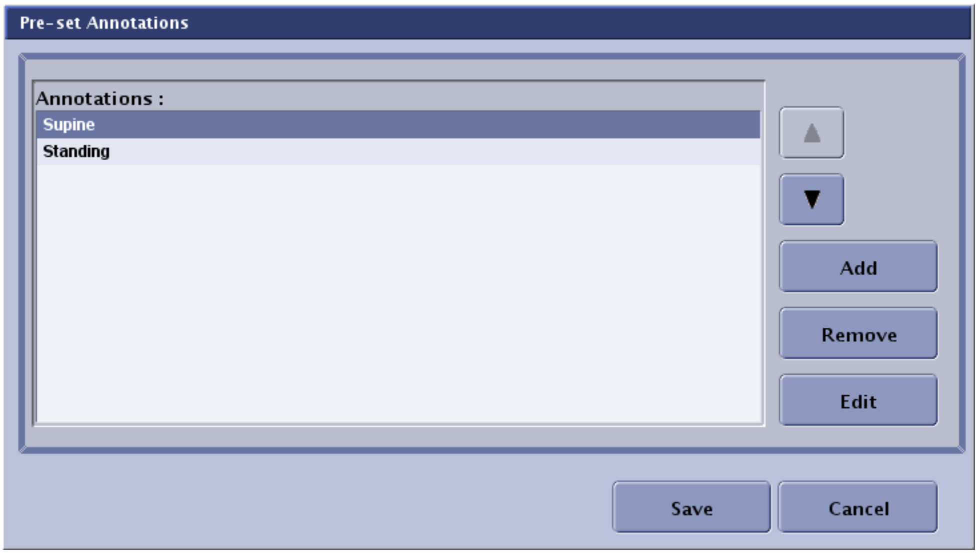
Pre-set Annotations

Viewer Preferences allow you to add, edit, or remove pre-set annotations.

Follow this process to configure pre-set annotations.

1. From the Worklist screen, click [UTILITIES].
2. Select **Preferences > Viewer**.
3. Click Pre-set Annotation [EDIT].
    - The Pre-set Annotations editing screen (Figure 15-18) appears.

Figure 15-18 Pre-set Annotation editing

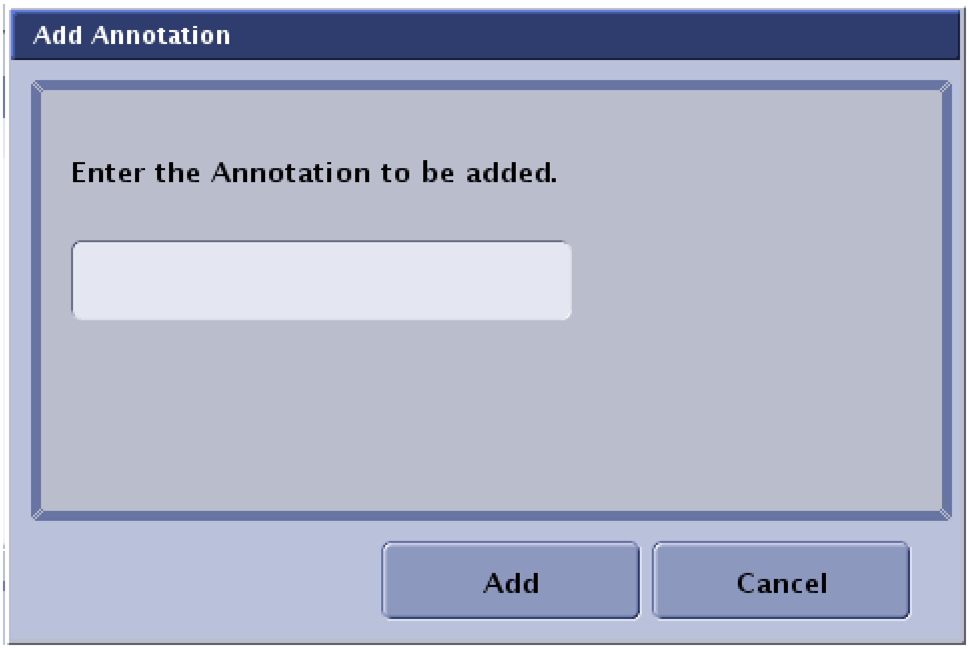

Pre-set Annotations
Annotations :
Supine
Standing
▲
▼
Add
Remove
Edit
Save
Cancel

4. To change the order of the list, select the annotation.
5. Click the [▲] or [▼] buttons to move the item up or down the list.
6. Add, Edit, or Remove annotations, as described below.
7. When finished, click [SAVE] to retain your changes.
8. Click [CLOSE].

Add Pre-set Annotation

1. From the Pre-set Annotations screen, click [ADD].
2. Enter the text of the annotation.

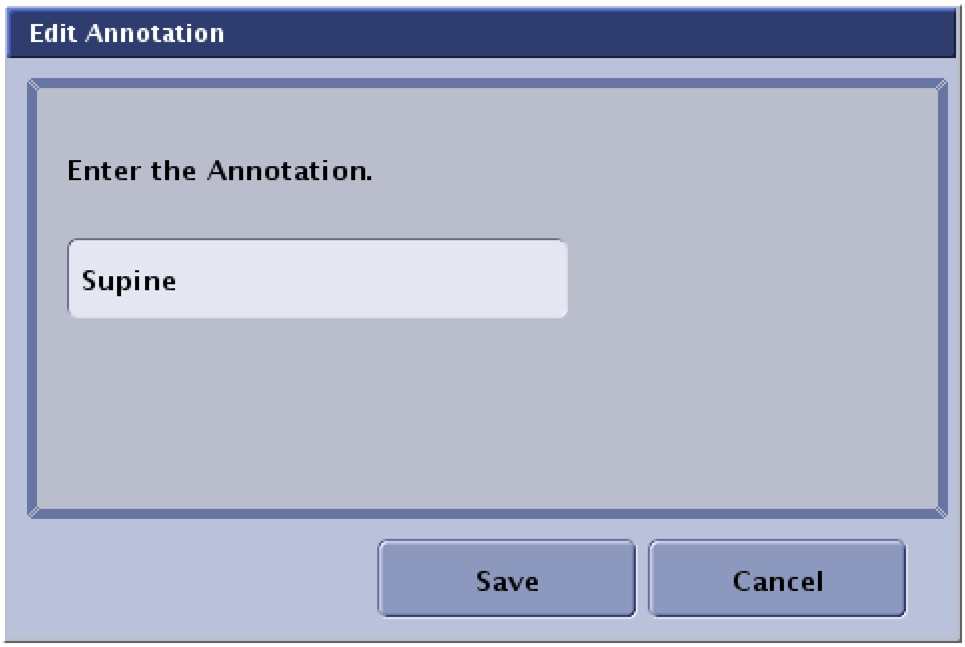
3. Click [ADD].


Add Annotation
Add
Cancel

Enter the Annotation to be added.

Edit Pre-set Annotation

1. From the Pre-set Annotations screen, select the annotation.
2. click [EDIT].
3. Edit the text of the annotation.
4. Click [SAVE].

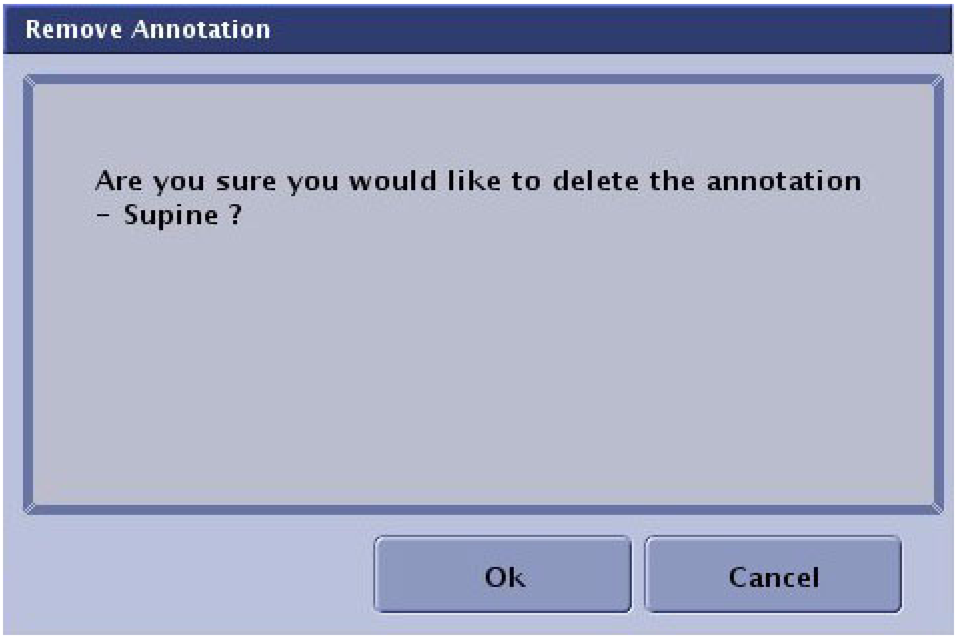

Edit Annotation
Save
Cancel

Enter the Annotation.

Supine

Remove

1. From the Pre-set Annotations screen, select the annotation.
2. Click [REMOVE].
   - A message appears: “Are you sure you would like to delete the annotation – (annotation name)?”
3. Click [OK].

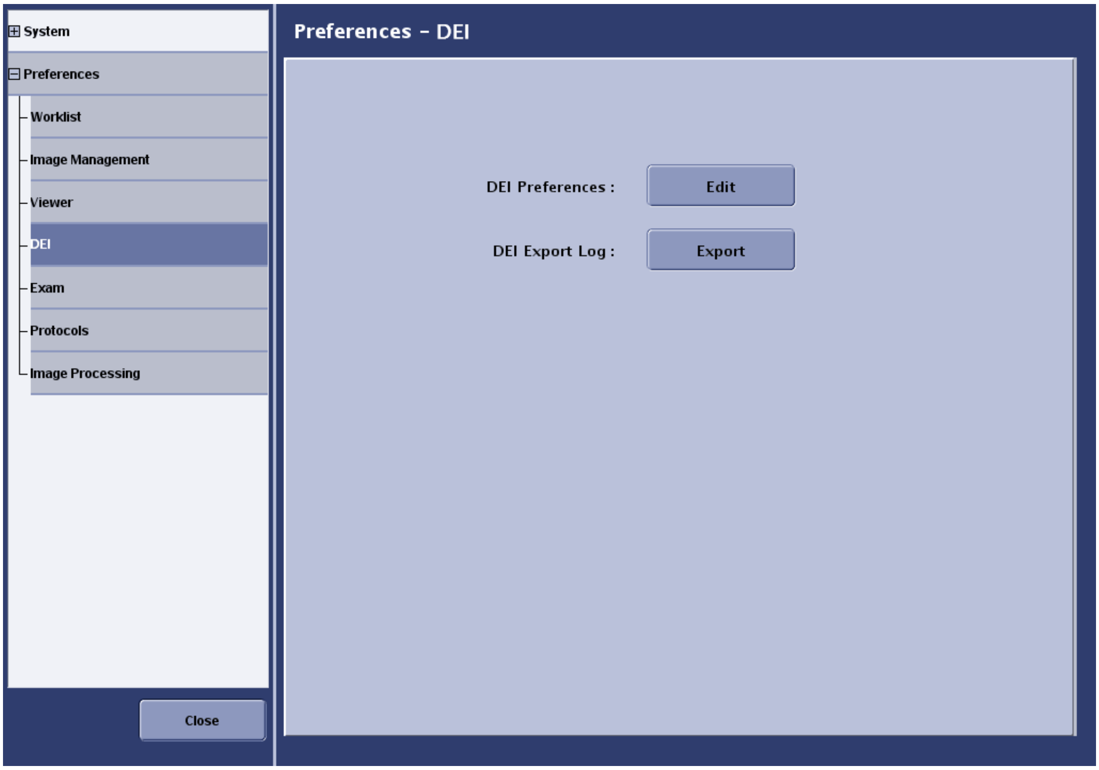


Remove Annotation

Are you sure you would like to delete the annotation – Supine ?

DEI (Detector Exposure Indicator)

Figure 15-19 Preferences - DEI screen


System
Preferences
Worklist
Image Management
Viewer
DEI
Exam
Protocols
Image Processing
Close
Preferences - DEI
DEI Preferences :
Edit
DEI Export Log :
Export

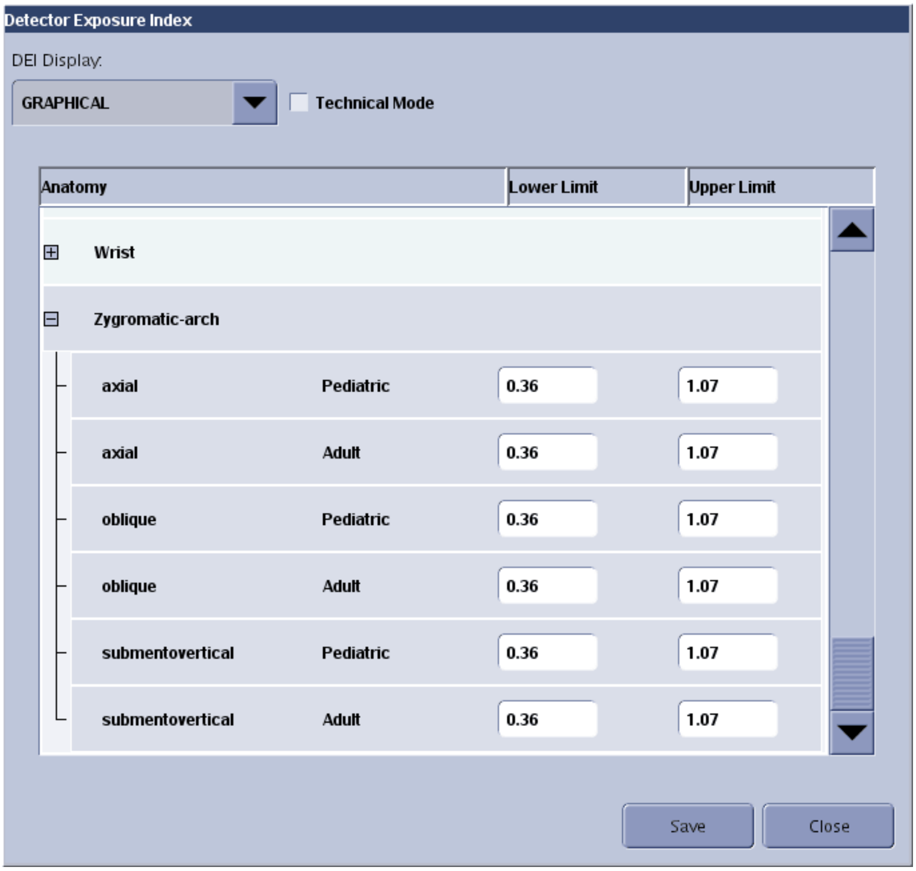
The Detector Exposure Index screen allows you to control if or how the DEI is displayed on the Image Viewer screen and to change the lower and upper limits for anatomical views.

These settings determine how DEI is displayed for all images.

Follow this process to change the DEI settings.

1. From the Worklist screen, press [UTILITIES].
2. Select Preferences > DEI.
3. Press DEI Preferences [EDIT].
    - The Detector Exposure Index screen (Figure 15-20) appears.
4. Continue with *Change the DEI Display* or *Change the Lower and Upper Limits*.

Figure 15-20 Detector exposure index screen



Detector Exposure Index

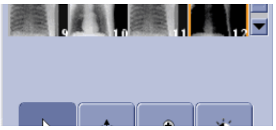
DEI Display: GRAPHICAL

☐ Technical Mode

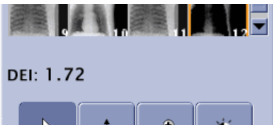
Anatomy		Lower Limit	Upper Limit
⊞ Wrist			
⊟ Zygromatic-arch			
axial	Pediatric	0.36	1.07
axial	Adult	0.36	1.07
oblique	Pediatric	0.36	1.07
oblique	Adult	0.36	1.07
submentovertical	Pediatric	0.36	1.07
submentovertical	Adult	0.36	1.07

Change the DEI Display

1. On the Detector Exposure Index screen, click the DEI Display drop-down list to open it.
2. Select the display option.
   - Available options are:
     - No Display

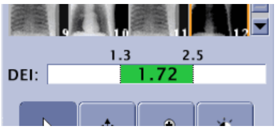
       

       In this example, there is no DEI information displayed on the Image Viewer screen.
     - Numerical

       DEI: 1.72

       In this example, only numerical DEI information displayed on the Image Viewer screen.
     - Graphical

       DEI: 1.72

       In this example, DEI information is displayed both numerically and graphically on the Image Viewer screen. This is the recommended display option.

3. Press [SAVE] to apply the change and close the screen.
   - [CLOSE] closes the screen without saving the changes.

Change the Lower and Upper Limits

1. On the Detector Exposure Indicator screen, click an anatomical category to expand it.
   - Click the category again to close it.
2. Change the lower and upper limits in the text boxes as appropriate for the view.
3. Repeat steps 1 and 2 for all applicable anatomical categories.
4. Click [SAVE] when finished to apply the changes and close the screen.
   - [CLOSE] closes the screen without saving the changes.

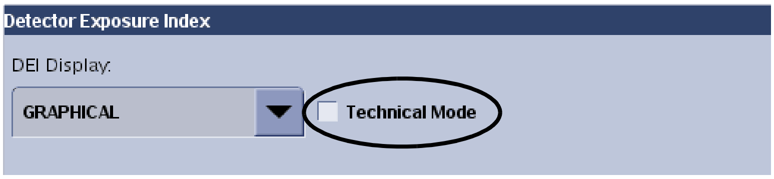
Enable or Disable Technical Mode

Technical Mode is a special setting that configures the system for image quality testing and detector calibration. When Technical Mode is enabled, DEI is calculated using the central area of the image (512 pixels x 512 pixels) regardless of the imaged anatomy.

IMPORTANT!: Do not acquire exam images when Technical Mode is enabled. The use of Technical Mode is reserved for image testing and calibration purposes only.

The checkbox (Figure 15-21) indicates if Technical Mode is enabled. Check or uncheck the box as appropriate and press [SAVE] to apply the change and close the screen.

Figure 15-21 Techinical mode checkbox



Detector Exposure Index

DEI Display: GRAPHICAL

☐ Technical Mode

Export the DEI Log

The DEI Log is used by GE Service personnel to track the doses to the detector over time. Continued low or high DEI values may indicate that the system needs calibration or that protocols and looks should be edited to accommodate your facility°Øs needs.

Follow this process to export the DEI Log.

1. Insert a blank CD-R or CD-RW disc.
2. From the Worklist screen, press [UTILITIES].
3. Select **Preferences > DEI**.
4. Press the DEI Export Log [EXPORT] button.

5. Remove the disc when export is complete.

Image Processing

The Image Processing preferences allow you to view the settings of default factory looks or to create up to five (5) custom looks. Image Processing Preferences also allow you to change which look is the default for the anatomical view.

The Image Processing settings may be accessed from the Image Viewer screen or the Utilities screen.

From the Image Viewer screen:

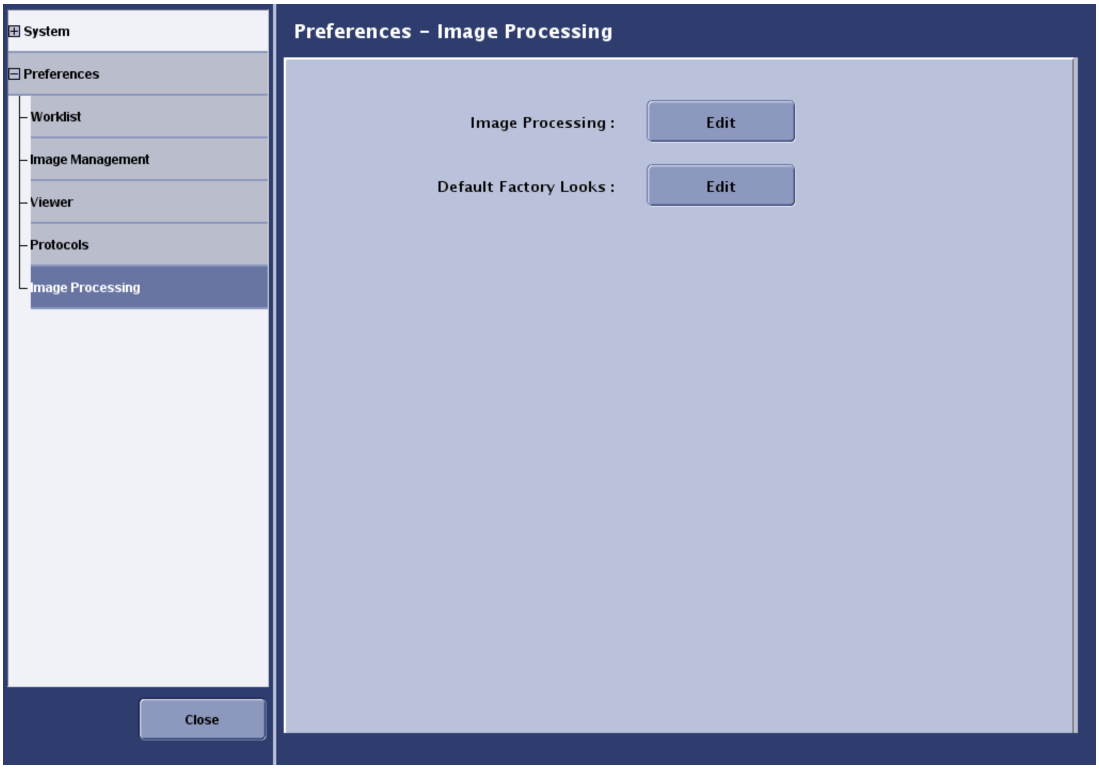
- Select the **Image Tools palette – Image Processing** tab.
- Click [EDIT PROC].

From the Utilities screen:

- Select **Preferences > Image Processing**.
- Click Image Processing [EDIT].

NOTE: After creating a custom look or changing the default look for an exam, the system must be reset in order for the changes to take effect. Refer to *Chapter 5: General Information-System Reset* for more information.

Figure 15-22 Preferences – Image Processing


⊞ System
⊟ Preferences
Worklist
Image Management
Viewer
Protocols
Image Processing
Close
Preferences – Image Processing
Image Processing :
Edit
Default Factory Looks :
Edit

Build Custom Looks

Looks are the way an image is processed to be viewed by a radiologist for interpretation.

Looks are pre-defined combinations of brightness, contrast, edge enhancement, and tissue equalization (TE). Refer to *Tissue Equalization Overview* for more information.

Factory Look descriptions:

- Factory Look 1 – similar to analog film, low edge, no TE.
- Factory Look 2 – low CR look, low edge, moderate tissue contrast.
- Factory Look 3 – moderate CR look, low edge, TE.
- Factory Look 4 – highly digital look, high edge, high TE.

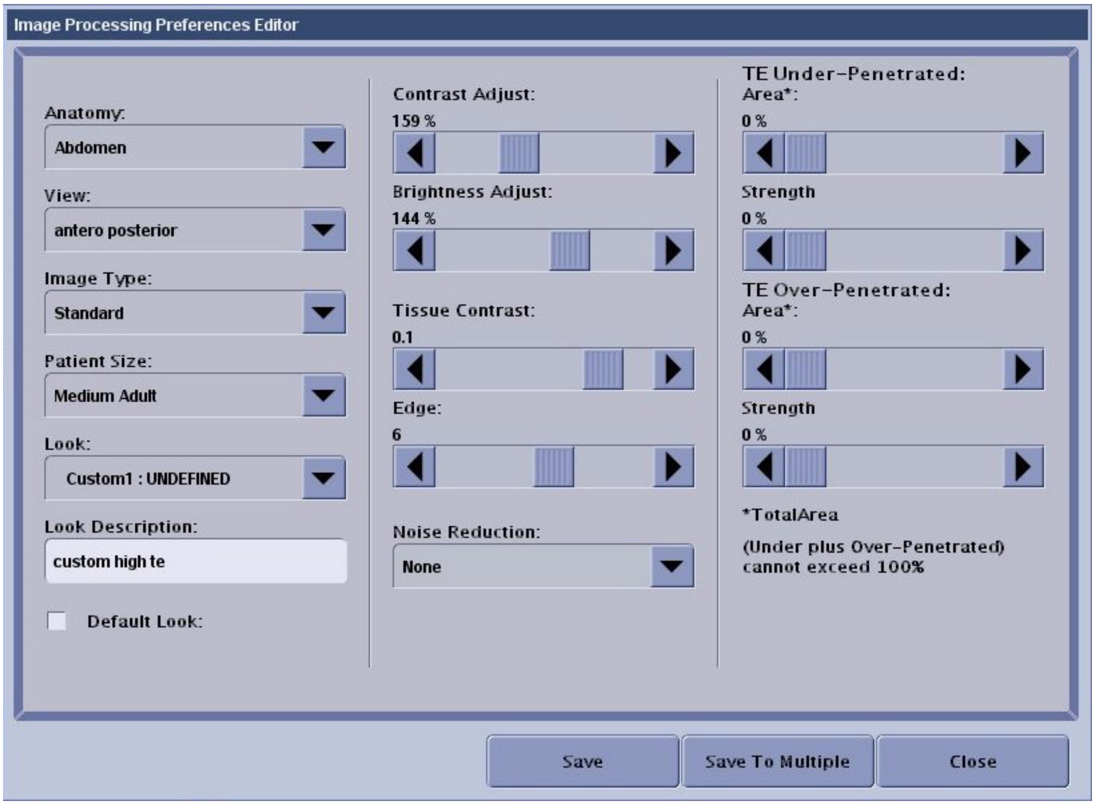
These factory looks apply to all exams.

Follow this process to create an new custom look.

Recommendation: When building a custom look, start with the factory look that is closest to the desired result. Write down the values and apply them to a new custom process. Then change the applicable variables.

1. From the Worklist screen, click [UTILITIES].
2. Select **Preferences > Image Processing.**
3. Click Image Processing [EDIT].
    - The Image Processing Preference Editor (Figure 15-23) appears.

Figure 15-23 Image Processing Preference Editor



Anatomy: Abdomen
View: antero posterior
Image Type: Standard
Patient Size: Medium Adult
Look: Custom1 : UNDEFINED
Look Description: custom high te
☐ Default Look:

Contrast Adjust: 159 %
Brightness Adjust: 144 %
Tissue Contrast: 0.1
Edge: 6
Noise Reduction: None

TE Under-Penetrated: Area*: 0 %
Strength 0 %
TE Over-Penetrated: Area*: 0 %
Strength 0 %

*TotalArea
(Under plus Over-Penetrated) cannot exceed 100%

4. Select the **Anatomy** (for example: Chest, Abdomen, Lumbar Spine, etc.).
5. Select the **View** (for example: antero-posterior or lateral).
6. Select the **Image Type**. Available options are: Standard, Soft-Tissue, and Bone.
7. Select the **Patient Size.** Available options are: Small Adult, Medium Adult, Large Adult, Small Pediatric, Medium Pediatric, or Large Pediatric.
8. Select the **Look**. Choose the first "Undefined" Custom look.

NOTE: If Factory Look is selected, parameters are read-only. Only Custom processing looks can be changed.

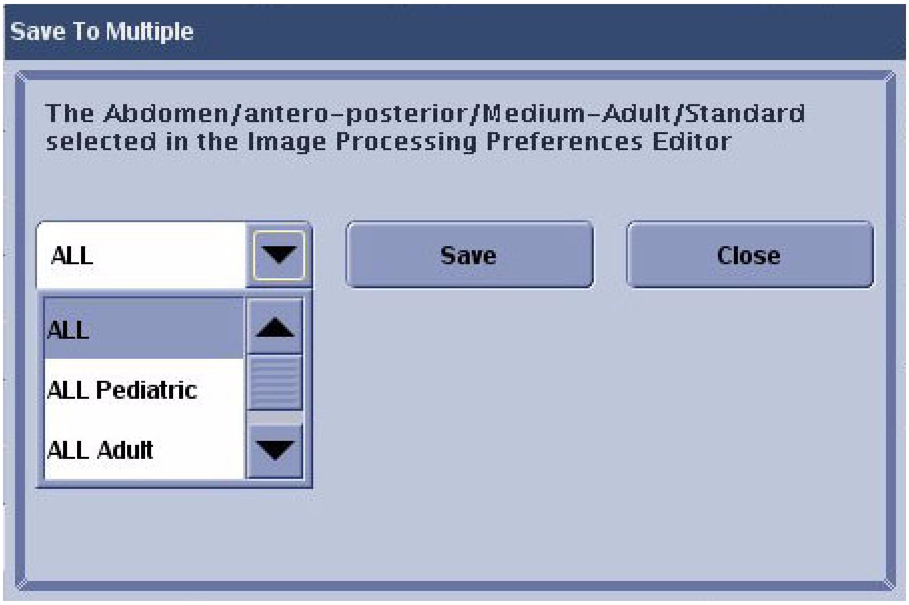
9. Enter new name in **Look Description** to rename the look:
   - The system will not accept a new look if the name remains "Undefined".
10. Check the **Make Default** box to set this look at the default for the selected Anatomy.
11. Adjust parameters as described in Table 15-11. Parameters may be adjusted in any order.

Table 15-11 Image Processing parameters

Parameter	Definition
Contrast Adjust	Adjusts image contrast. Also known as window width. • Move the slider right for more contrast (towards pure black and white). • Move the slider left for less contrast (towards uniform gray). Range: 0% – 100% with increment of 1%
Brightness Adjust	Adjusts image brightness from 1-100%. Also known as window level. • Move the slider right for a lighter image. • Move the slider left for a darker image. **NOTE:** Brightness Adjust and Contrast Adjust are used to modify the look of images from a particular exam. They should not be used for per-image tuning/correction of brightness and contrast. For example, if images from a particular type of exam are appearing consistently lighter than they should be, the Brightness Adjust slider can be moved left to adjust. However, for small alterations of brightness on a particular image, use the Brightness and Contrast sliders in the Image Viewer screen.
Tissue Contrast	Controls the general contrast between the thick and thin anatomy. • Move the slider right to decrease bone/soft-tissue contrast. • Move the slider left to increase bone/soft-tissue contrast. Range: –0.15 to 0.15 with 0.01 increments. **NOTE:** Unlike Tissue Equalization, which controls contrast within under-penetrated (thick) or over-penetrated (thin) areas, Tissue Contrast controls the general contrast between the thick and thin anatomy. For example, Tissue Contrast can be used in combination with Tissue Equalization to define a Chest PA look that is equalized in the lung fields, but with light spine/ribs.
Edge	The amount of detail visible in bone structures. Increased edge equals increased detail. • Move the slider right to make images sharper. • Move the slider left to make images smoother. Range: 1 to 10 (discrete setting)

Parameter	Definition
Noise Reduction	Suppresses the mottle noise in denser areas of the anatomy while preserving detail in the rest of the image. Available options are: • None – no noise reduction • Low • Medium • High – maximum noise reduction **NOTE:** The noise reduction feature suppresses the mottle noise in denser areas of the anatomy while preserving detail in the rest of the image. The algorithm takes into account tissue penetration and dose reaching the detector. For example, if two Chest PA images were acquired on the same patient, one with much higher dose than the other, noise reduction may only affect the lower dose (higher noise) image. In general, the lowest Noise Reduction setting that produces the desired image quality should be selected.
TE Settings	See Tissue Equalization section for range and effect of TE sliders. Refer to *Tissue Equalization Overview* for more information. **NOTE:** The combined total of the TE Under-penetrated and TE Over-penetrated areas cannot exceed 100%. The slider will automatically stop and a message appears: “The Total Area cannot exceed 100%. Reduce the (Under- or Over-) Penetrated area to proceed.”

12. When finished adjusting parameters, click [SAVE] or [SAVE TO MULTIPLE].
    - [SAVE] applies the parameters to the currently selected patient size.
        - A message appears: "Save changes?"
        - Click [YES].
    - [SAVE TO MULTIPLE] applies the parameters to multiple patient sizes within the selected anatomy.
        - The Save to Multiple screen appears.
        - Select the **Patient Size** to save the new look to.
        - Click [SAVE].



The Abdomen/antero-posterior/Medium-Adult/Standard selected in the Image Processing Preferences Editor

13. Click [CLOSE] on the Image Processing Preference Editor.
14. Log off and reset the system for changes to take effect. Refer to *Chapter 5: General Information* for more information.

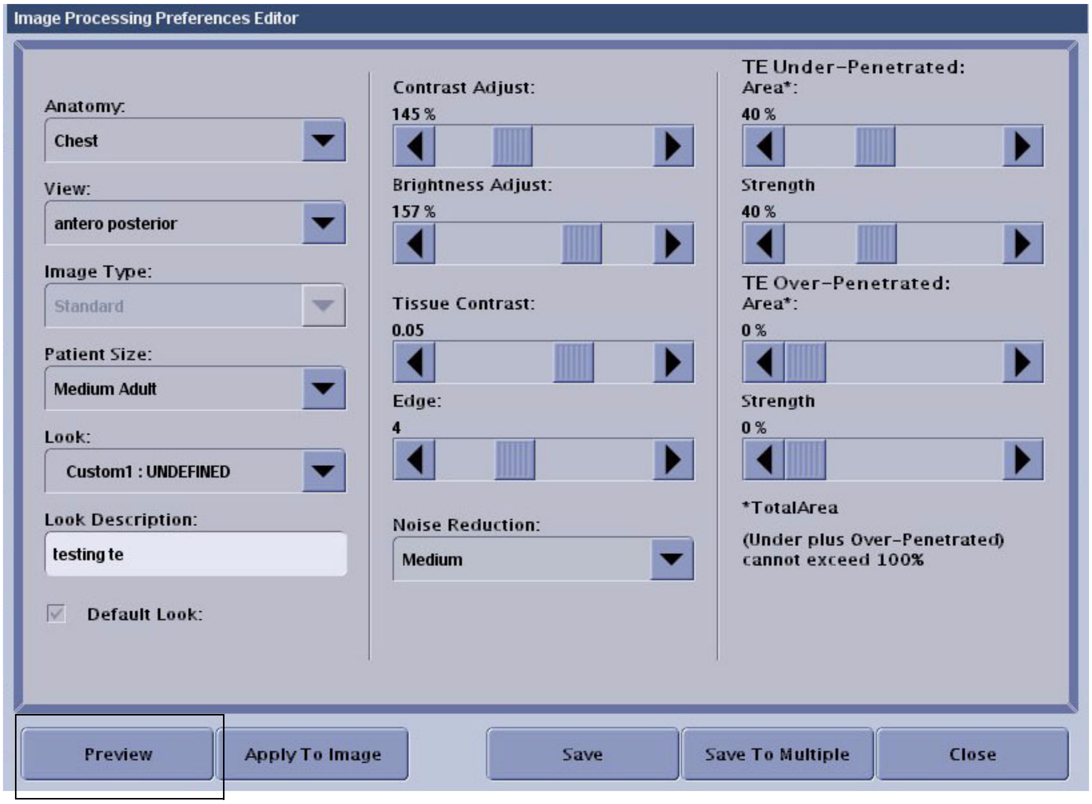
Change Image Processing from the Viewer

Changing the image processing from the Image Viewer screen applies the process changes to a specific image, but also allows mapping the process change to multiple.

Follow the steps listed above to make the processing changes.

When opened from the Image Viewer screen the, Image Processing Preference Editor screen also has a [PREVIEW] and [APPLY TO IMAGE] button. [PREVIEW] applies the settings to the currently selected image in the Image Viewer screen so that you can see the effect before saving the changes.

Figure 15-24 Image processing preferences editor screen opened from the Viewer



Anatomy: Chest

View: antero posterior

Image Type: Standard

Patient Size: Medium Adult

Look: Custom1 : UNDEFINED

Look Description: testing te

☑ Default Look:

Contrast Adjust: 145 %

Brightness Adjust: 157 %

Tissue Contrast: 0.05

Edge: 4

Noise Reduction: Medium

TE Under-Penetrated: Area*: 40 %

Strength 40 %

TE Over-Penetrated: Area*: 0 %

Strength 0 %

*TotalArea (Under plus Over-Penetrated) cannot exceed 100%

Change Default Factory Looks for Exams

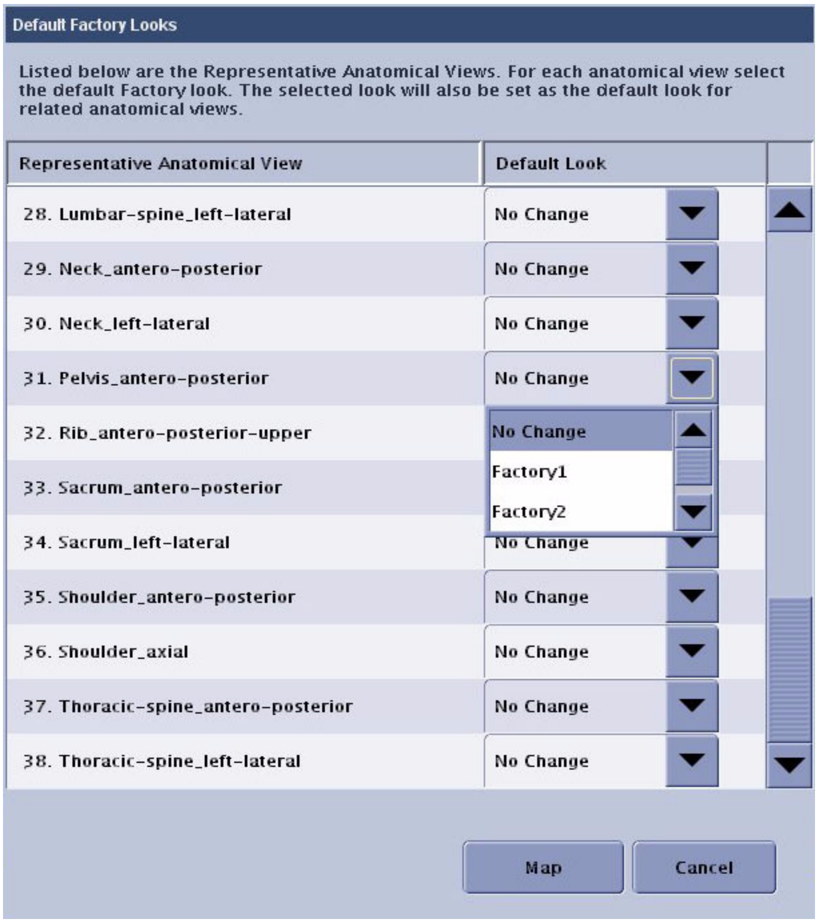
The Default Factory Looks screen (Figure 15-25) allows you to change the default processing setting for all 34 anatomical views.

At the initial applications setup, the radiologist chooses the default look for each anatomical view. Applications assigns the looks to the system.

Follow this process to change the default factory looks.

1. From the Worklist screen, click [UTILITIES].
2. Select **Preferences > Image Processing**.
3. Click Default Factory Looks [EDIT].
4. Use the drop-down lists to change the default for the desired anatomical views.
5. When finished, click [MAP] to save the changes.
6. Log off and reset the system to apply the changes.

Figure 15-25 Default Factory Looks



Default Factory Looks

Listed below are the Representative Anatomical Views. For each anatomical view select the default Factory look. The selected look will also be set as the default look for related anatomical views.

Representative Anatomical View	Default Look
28. Lumbar-spine_left-lateral	No Change
29. Neck_antero-posterior	No Change
30. Neck_left-lateral	No Change
31. Pelvis_antero-posterior	No Change
32. Rib_antero-posterior-upper	
33. Sacrum_antero-posterior	
34. Sacrum_left-lateral	No Change
35. Shoulder_antero-posterior	No Change
36. Shoulder_axial	No Change
37. Thoracic-spine_antero-posterior	No Change
38. Thoracic-spine_left-lateral	No Change

Tissue Equalization Overview

Tissue Equalization (TE) is an advanced image-processing algorithm that improves contrast and visibility in over-penetrated and under-penetrated regions of an image without compromising the contrast in other regions of interest. In combination with the wide dynamic range of the GE Revolution? digital detector, TE allows display of more information collected in a single shot, reducing re-takes and increasing throughput.

TE Usage

Over-penetrated Regions

An over-penetrated region in an image results from x-rays passing through a relatively less dense region of the anatomy such as soft tissue (skin edge).

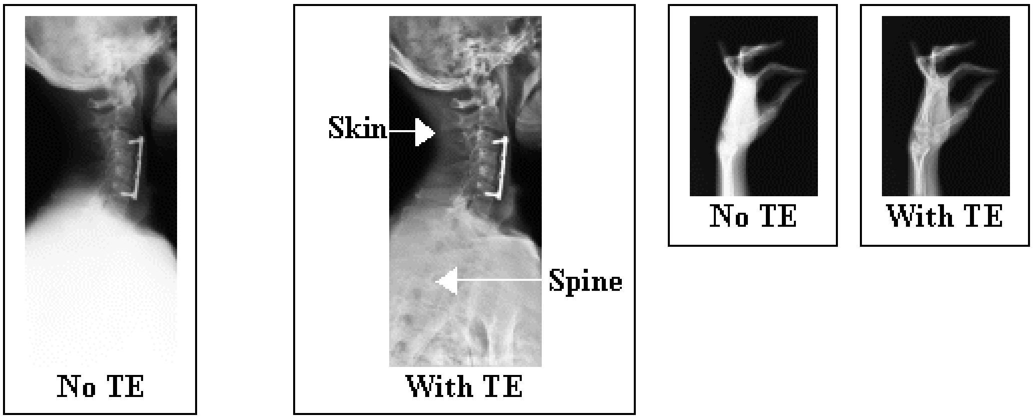
Over-penetrated regions of an image appear darker with reduced contrast. Using TE, the contrast in such regions can be enhanced to improve visualization of soft-tissue. TE can also be used to enhance vessel contrast in lungs. In Figure 15-26, the skin edge around the neck is more clearly defined with TE.

Under-penetrated Regions

An under-penetrated region in an image results from insufficient x-rays passing through relatively dense anatomical regions. For example, anatomy containing dense tissue (abdomen) and bone (ankles/wrists/shoulders) result in under-penetrated images.

Under-penetrated regions of an image such as the cervical and thoracic spine appear white- white spine obscured by the overlaying anatomy like the white shoulders. Using TE, the overlaying anatomy can be made grayer making the underlying spine more visible (Figure 15-26). A hand image can similarly be displayed with improved bone contrast. This makes TE an invaluable tool in visualizing the entire bone field.

Figure 15-26 Comparison with and without Tissue Equalization



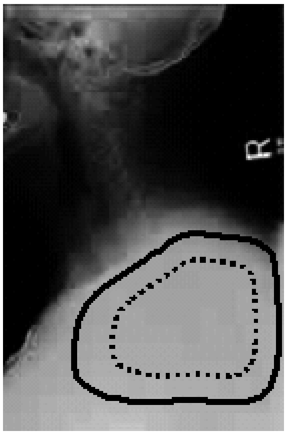
TE parameters

TE uses the information in the image to improve visualization. Two user-defined parameters; AREA and STRENGTH; control the extent and amount of TE that is applied to the image. There is an AREA and STRENGTH parameter for over-penetrated regions and an AREA and STRENGTH parameter for under-penetrated regions.

Area

The AREA parameter defines the extent of application of the TE algorithm to the image. Increasing AREA increases the number of image pixels to which TE is applied. For example, in Figure 15-27, setting the AREA to 30% for under-penetrated region uses the pixels within the dotted ROI. Increasing AREA to 60% increases the number of pixels where TE is applied, as indicated by the solid ROI.

Figure 15-27 Using the AREA parameter in TE



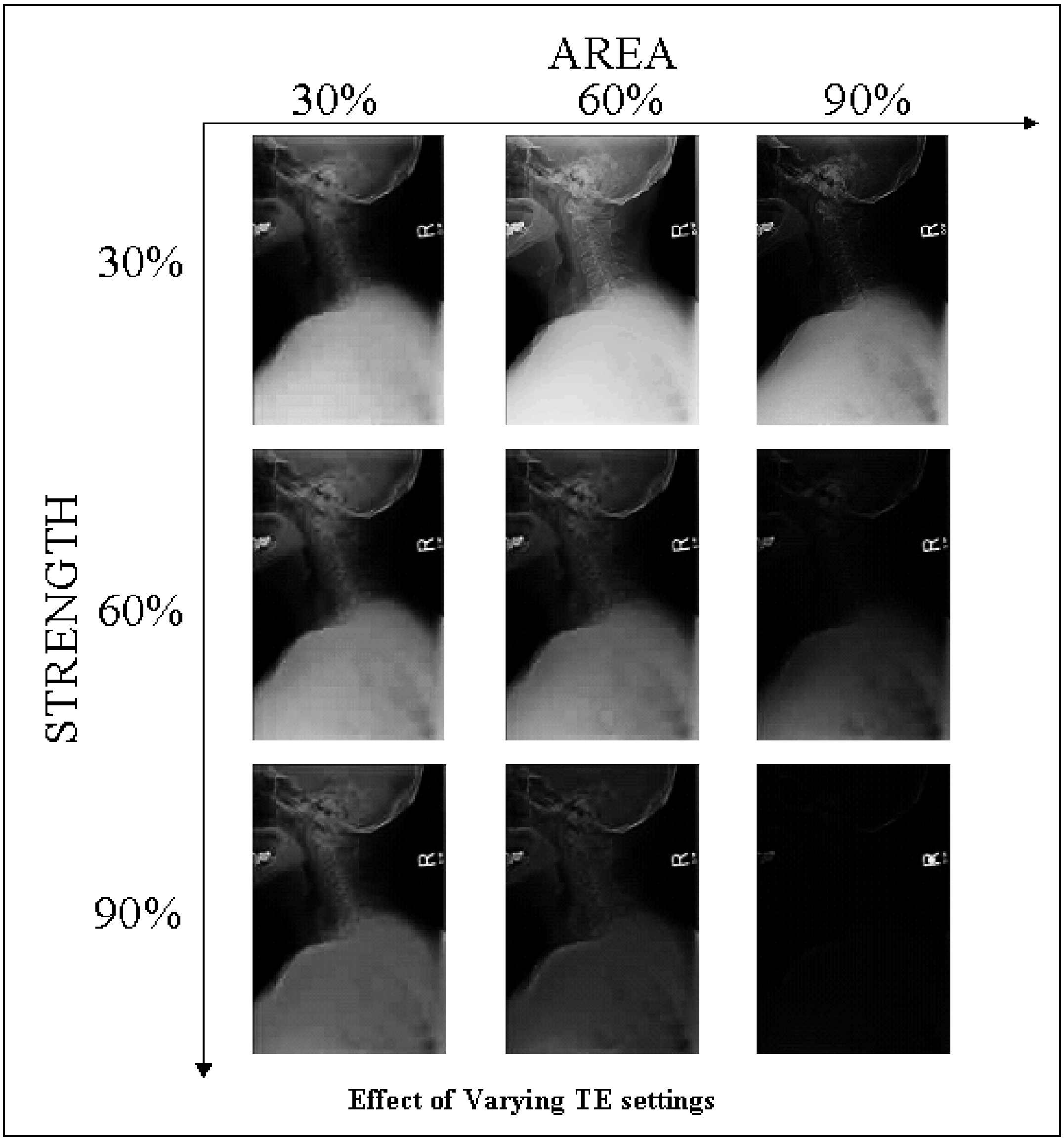
The combined AREA parameters for the over and under-penetrated regions cannot be greater than 100%. For example if the AREA parameter for over-penetrated regions is set to 40%, the AREA parameter for under-penetrated regions cannot be greater than 60% (100-40).

Strength

The STRENGTH parameter affects the grayness of a region when TE is applied to it. For example, increasing STRENGTH for under-penetrated regions such as shoulders makes a white region grayer. Increasing STENGTH for over-penetrated regions such as lungs makes a black region grayer. In both cases, increasing STRENGTH generally makes the region grayer.

The effect of varying AREA and STRENGTH in TE is demonstrated in Figure 15-28 for under-penetrated regions. Increasing STRENGTH while keeping the AREA constant makes the pixel grayer in the shoulder region. Increasing AREA extends the region that becomes gray.

Figure 15-28 Varied TE settings

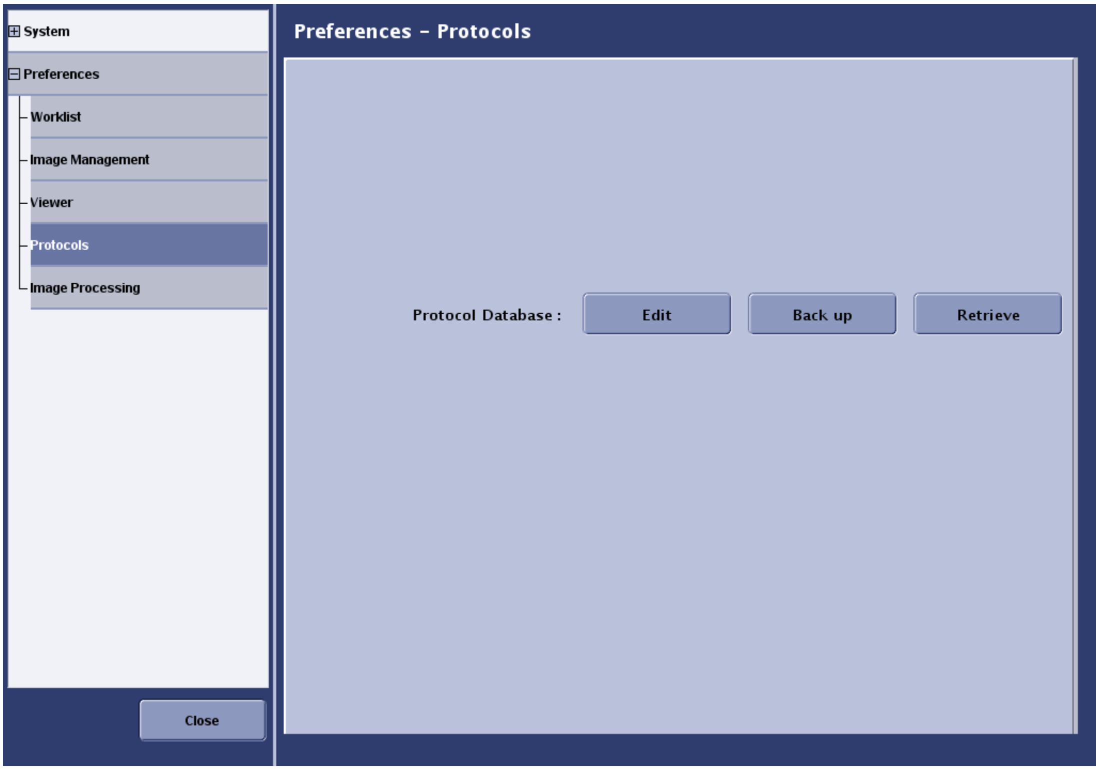

AREA
30%
60%
90%
STRENGTH
30%
60%
90%
Effect of Varying TE settings

NOTE: Unlike Tissue Equalization, which controls contrast within under-penetrated (thick) or over-penetrated (thin) areas, Tissue Contrast controls the general contrast between the thick and thin anatomy. For example, Tissue Contrast can be used in combination with Tissue Equalization to define a Chest PA look that is equalized in the lung fields, but with light spine/ribs.

Protocols

Protocols preferences allow you to create backup copies of the protocol database, retrieve saved backups, and create new protocols.

Figure 15-29 Preferences - Protocols screen


⊞ System
⊟ Preferences
Worklist
Image Management
Viewer
Protocols
Image Processing
Close
Preferences – Protocols
Protocol Database :
Edit
Back up
Retrieve

Backup Protocol Database to CD

The Backup function allows you to save the entire protocols database (parameters) to a CD. This is important when editing protocols; backup ensures that the current database stays intact. Backup is also important in case of system failure and all protocol information is lost. If necessary, the old database can be retrieved and used.

Follow this process to back up the database to a CD.

NOTE: Always use a new, blank CD-R or CD-RW for each back up.

1. From the Worklist screen, click [UTILITES].
   - The Utilities screen appears.
2. Select **Preferences > Protocols.**
3. Insert a blank CD into the CD tray.
4. Close the CD tray.

5. Click [BACK UP].
   - A message appears: “Press OK to continue with Protocol Database back up.”
6. Click [OK].
   - The protocol database is saved to the CD.
7. Remove the CD from the CD tray.
8. Label the CD and store it in a safe place.

Retrieve Protocol Database from CD

The Retrieve function allows you to re-cover a protocol database that was saved to a CD.

NOTE: When retrieving, the procedures saved on the CD will overwrite all of the procedures on the system.

Follow this process to retrieve a protocol database from CD.

1. From the Worklist screen, click [UTILITES].
   - The Utilities screen appears.
2. Select **Preferences > Protocols**.
3. Insert the CD with the saved protocols database into the CD tray.
4. Close the CD tray.
5. Click [RETRIEVE].
   - A message appears: “Press OK to continue with Protocol Database retrieve.”
6. Click [OK].
   - The saved protocol database is loaded onto the system.
7. Remove the CD from the CD tray. Store the CD in a safe place.

Edit Protocol Database

The Protocol Editor allows you to create custom acquisition protocols. It allows the creation of anatomical categories, exam sets, and individual views for exams.

It allows the edit and removal of categories, exams, and views.

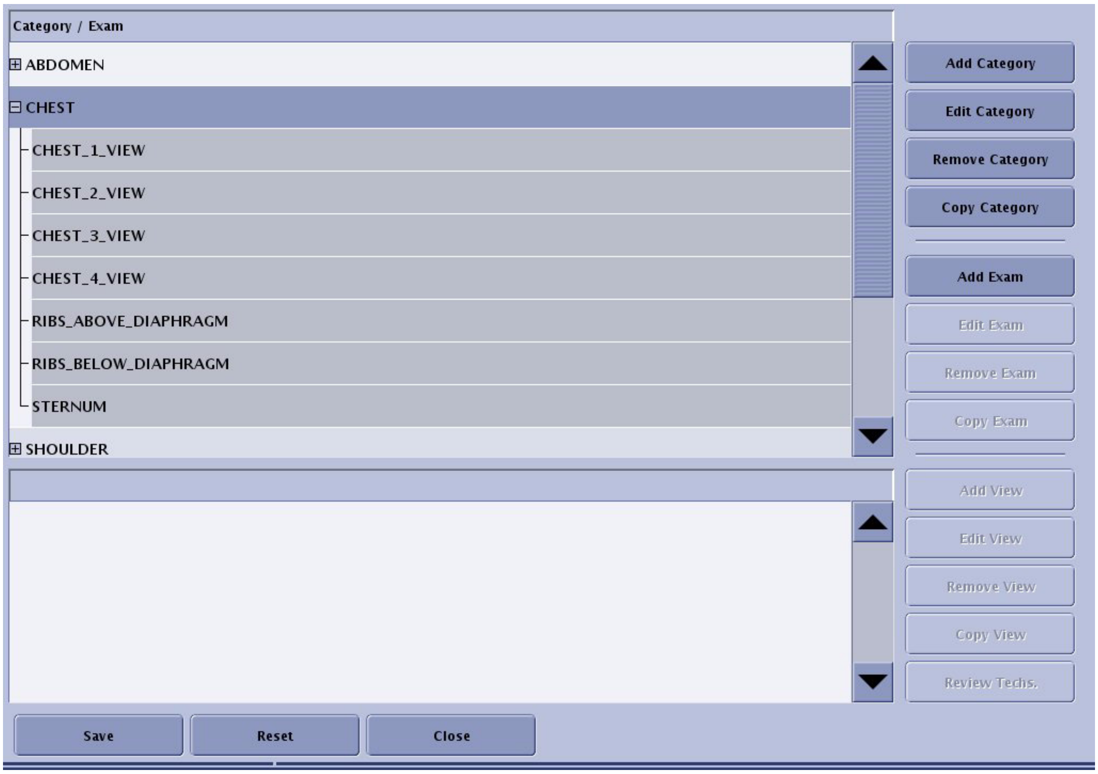
NOTE: Names of categories, exams, and views cannot contain spaces. Use underscores (_) to separate words (for example, “Neck_AP”).

NOTE: It is recommended that you back up the database to CD before and after custom changes are made. Database backup is done by selecting the backup button on the Preferences - Protocols screen. Refer to *Backup Protocol Database to CD* for more information.

Follow this process to access the Protocol Database Editor.

1. From the Worklist, select [UTILITIES].
2. Select **Preferences > Protocols**.
3. Click [EDIT].
    - The Exam Menu appears.
4. Continue with Add or Edit Category, Add or Edit Exam, or Add or Edit View.

Figure 15-30 Exam Menu

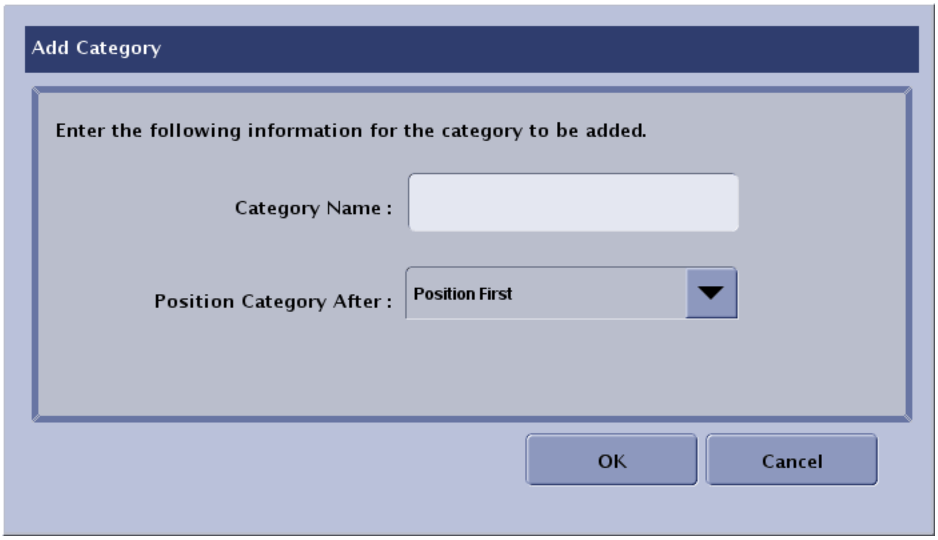

Category / Exam
⊞ ABDOMEN
⊟ CHEST
CHEST_1_VIEW
CHEST_2_VIEW
CHEST_3_VIEW
CHEST_4_VIEW
RIBS_ABOVE_DIAPHRAGM
RIBS_BELOW_DIAPHRAGM
STERNUM
⊞ SHOULDER
Add Category
Edit Category
Remove Category
Copy Category
Add Exam
Edit Exam
Remove Exam
Copy Exam
Add View
Edit View
Remove View
Copy View
Review Techs.
Save
Reset
Close

Add or Edit Category

NOTE: The screens and process to edit a category are the same as for adding a category.

From the Exam Menu:

1. Click [ADD CAT] or [EDIT CAT].
   - The Add Category (or Edit Category) screen appears.



Add Category

Enter the following information for the category to be added.

Category Name :

Position Category After : Position First

2. Type a **Category Name**. (Use underscores instead of spaces.)
3. From the **Position Category After** drop-down list, select the placement of the new category on the category list.
4. Click [OK].
5. Continue with *Add or Edit Exam*.

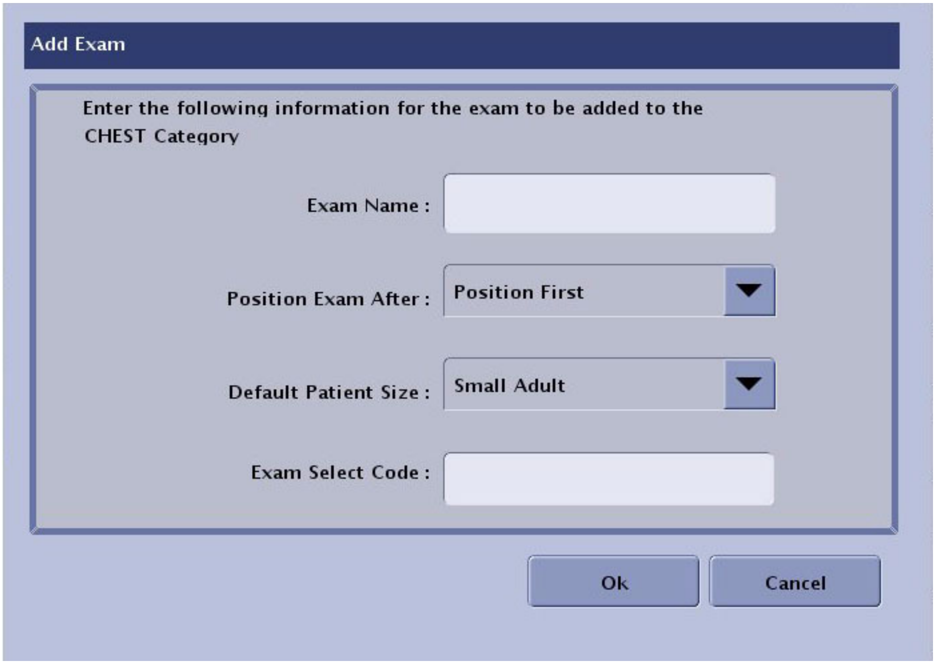
NOTE: Exams and views must be added or copied into the new category in order for it to be fully functional.

Add or Edit Exam

NOTE: The screens and process to edit an exam are the same as for adding a exam.

From the Exam Menu:

1. Select the category for the new exam.
2. Click [ADD EXAM] or [EDIT EXAM].
   - The Add Exam (or Edit Exam) screen appears..



Enter the following information for the exam to be added to the CHEST Category

Exam Name :

Position Exam After : Position First

Default Patient Size : Small Adult

Exam Select Code :

3. Type an **Exam Name**. (Use underscores instead of spaces.)
4. From the **Position Exam After** drop-down list, select the position of the exam within the category.
5. Select the **Default Patient Size** for the exam.
6. Click [OK].
7. Continue with *Add or Edit View*.

NOTE: Exams must be populated with new or copied views after creation in order to be fully functional.

Add or Edit View

NOTE: The screens and process to edit a view are the same as for adding a view.

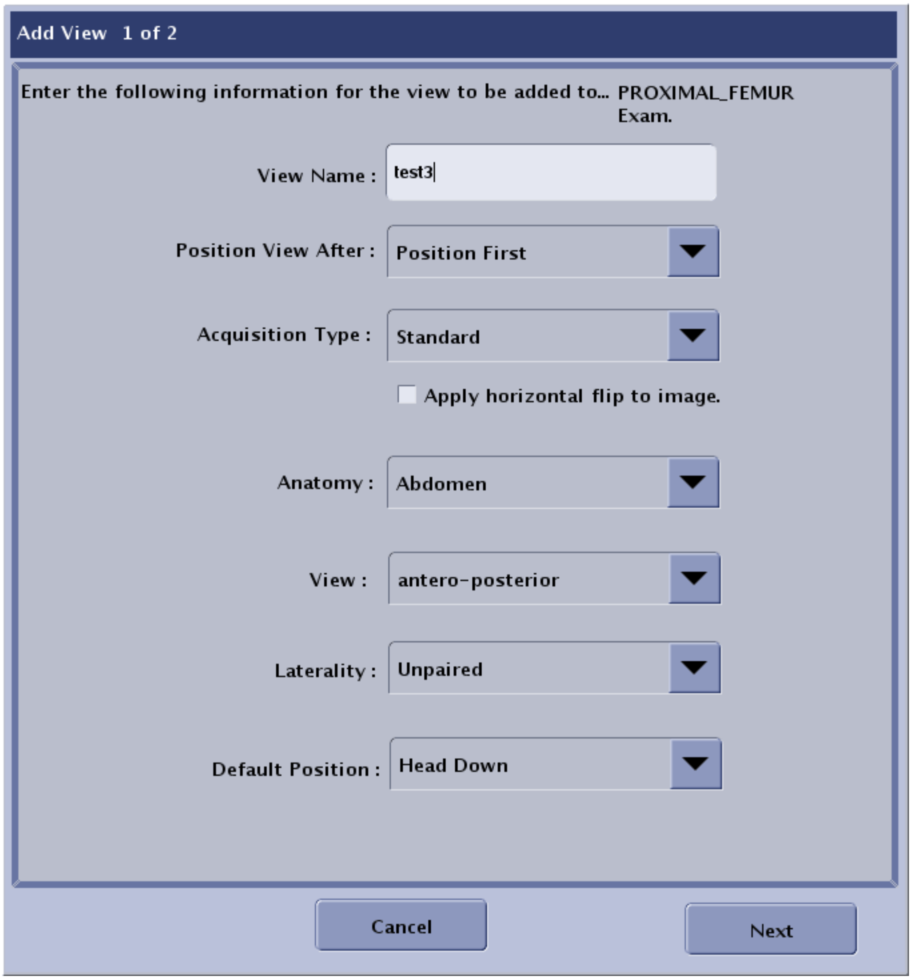
NOTE: This process has multiple screens.

From the Exam Menu:

1. Expand the **Category**.
2. Select the Exam to add or copy the new view to.

3. Click [ADD VIEW] or [EDIT VIEW].
   - The Add View (or Edit View) screen (1 of 2) appears.

Figure 15-31 Add (or Edit) View (1 of 2)



Add View 1 of 2

Enter the following information for the view to be added to... PROXIMAL_FEMUR Exam.

View Name : test3

Position View After : Position First

Acquisition Type : Standard

☐ Apply horizontal flip to image.

Anatomy : Abdomen

View : antero-posterior

Laterality : Unpaired

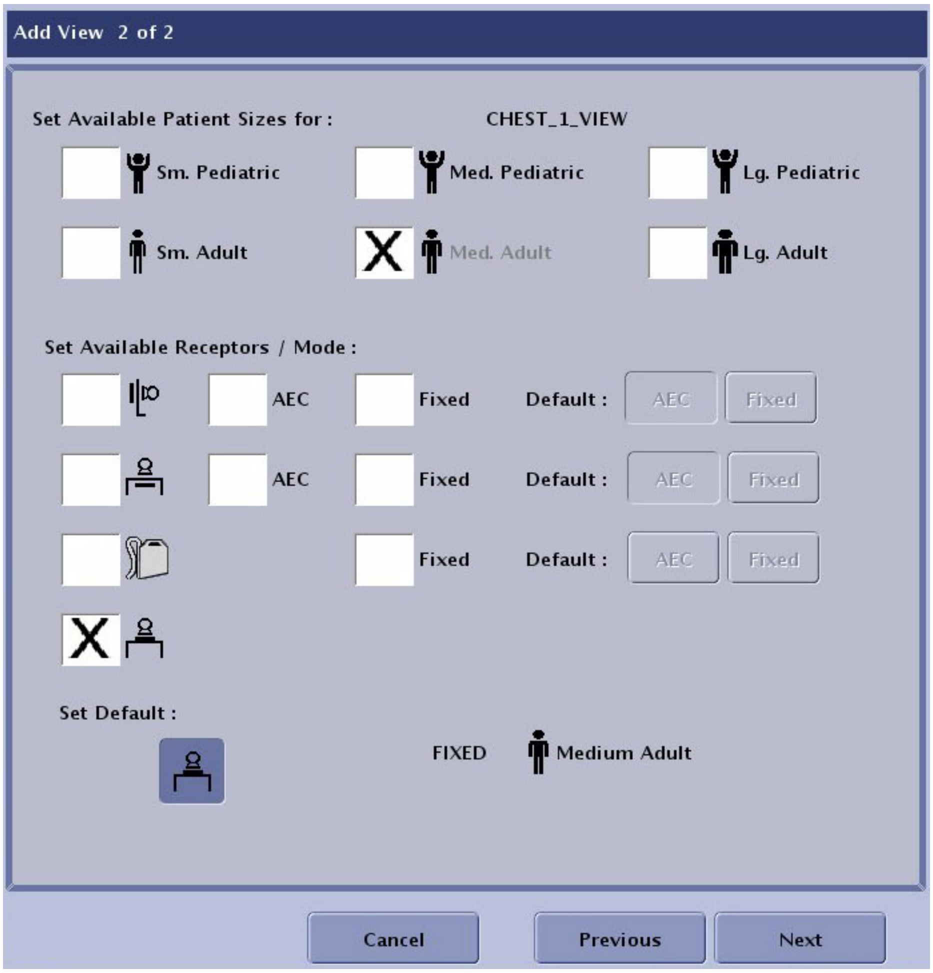
Default Position : Head Down

4. Type a **View Name**. Do not use spaces. Use underscores (_) to separate words.
5. From the **Position View After** drop-down list, select the placement of the view within the exam.
6. Select the **Acquisition Type**:
   - Options are:
     - Standard
     - Dual Energy
7. Check if **horizontal image flip** is to be applied when displaying the image.
8. Select the **Anatomy**.

NOTE: This will determine the image processing for the view. Be sure to select the appropriate anatomy for the body part imaged.

9. Select the most appropriate **View** (AP, Lat, etc.).
10. Select the **Laterality**:
    - Options are:
        - Paired (exam has R or L, as with extremities). This selection allows the Patient Side control to become active on the Image Acquisition screen. Refer to *Chapter 7: Image Acquisition* for more information.
        - Unpaired (such as abdomen or chest).
11. Select the **Default Position**:
    - Options are:
        - Head up – patient is in normal head first position on table relative to detector
        - Head down – patient is on the table feet first
12. Click [NEXT].
    - The Add View (or Edit View) screen (2 of 2) appears.

Figure 15-32 Add (or Edit) View (2 of 2)



Add View 2 of 2
Set Available Patient Sizes for :
CHEST_1_VIEW
☐ Sm. Pediatric
☐ Med. Pediatric
☐ Lg. Pediatric
☐ Sm. Adult
☒ Med. Adult
☐ Lg. Adult
Set Available Receptors / Mode :
☐ ☐ AEC ☐ Fixed Default : AEC Fixed
☐ ☐ AEC ☐ Fixed Default : AEC Fixed
☐ ☐ Fixed Default : AEC Fixed
☒
Set Default :
FIXED
Medium Adult
Cancel
Previous
Next

13. Select all **Patient Sizes** you want available for the view. The default size will automatically be selected.

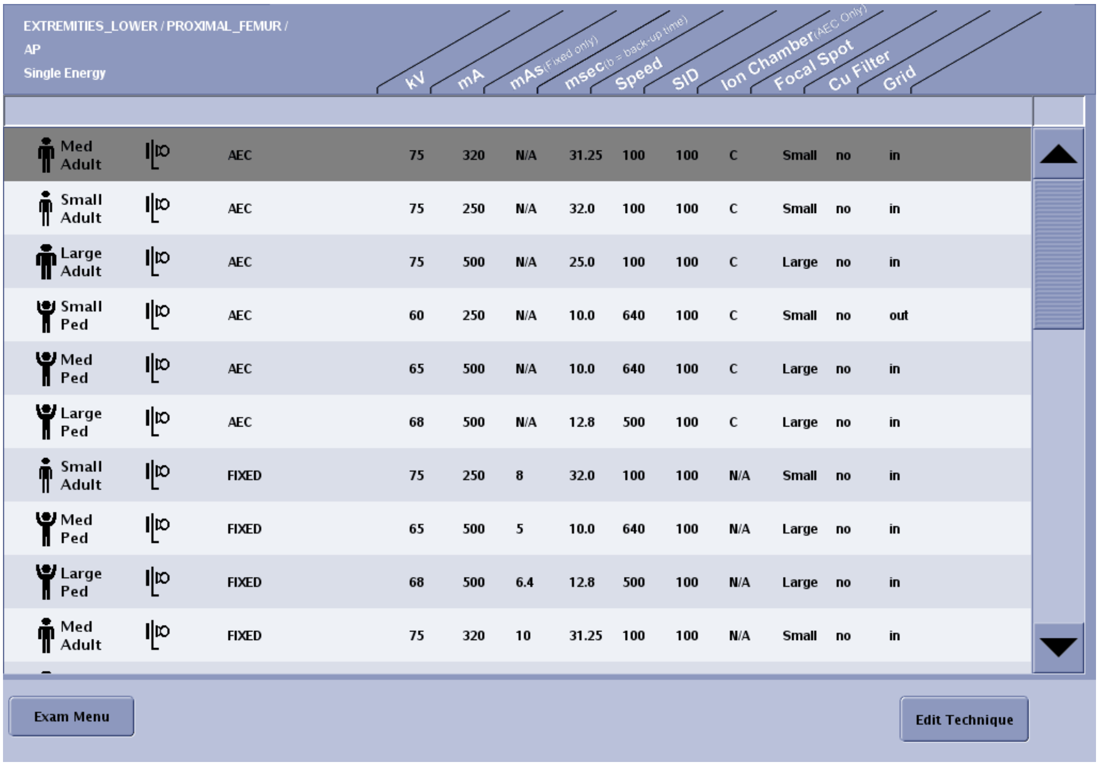
14. Select **Receptors and Modes** for each selected receptor.

15. Select the **Default Mode** (AEC or Fixed) for each receptor.

16. Select the **Default Receptor**.

17. Click [OK].

- The Review screen appears.



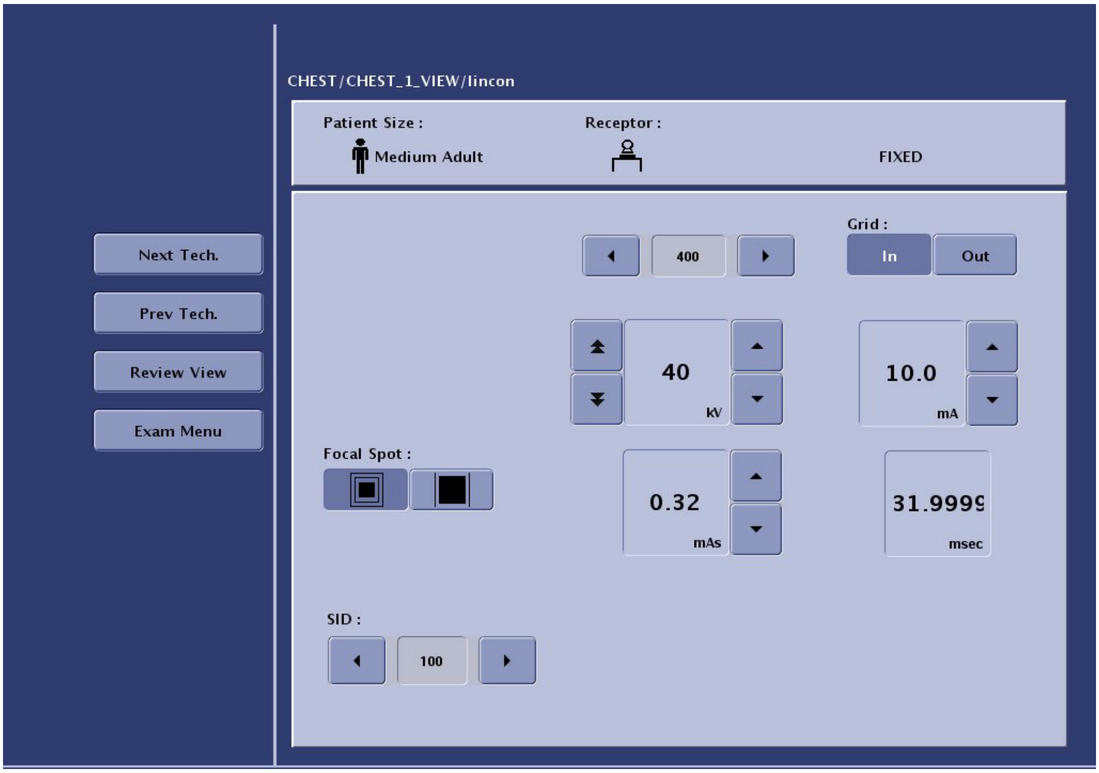
EXTREMITIES_LOWER / PROXIMAL_FEMUR /
AP
Single Energy

		kV	mA	mAS (Fixed only)	msec (b = back-up time)	Speed	SID	Ion Chamber (AEC Only)	Focal Spot	Cu Filter	Grid
Med Adult	AEC	75	320	N/A	31.25	100	100	C	Small	no	in
Small Adult	AEC	75	250	N/A	32.0	100	100	C	Small	no	in
Large Adult	AEC	75	500	N/A	25.0	100	100	C	Large	no	in
Small Ped	AEC	60	250	N/A	10.0	640	100	C	Small	no	out
Med Ped	AEC	65	500	N/A	10.0	640	100	C	Large	no	in
Large Ped	AEC	68	500	N/A	12.8	500	100	C	Large	no	in
Small Adult	FIXED	75	250	8	32.0	100	100	N/A	Small	no	in
Med Ped	FIXED	65	500	5	10.0	640	100	N/A	Large	no	in
Large Ped	FIXED	68	500	6.4	12.8	500	100	N/A	Large	no	in
Med Adult	FIXED	75	320	10	31.25	100	100	N/A	Small	no	in

18. Click [EDIT TECHNIQUE].

- The Edit Techniques screen appears.

Figure 15-33 Edit technique screen



CHEST/CHEST_1_VIEW/lincon

Patient Size : Medium Adult

Receptor : FIXED

Grid : In

400

40 kV

10.0 mA

0.32 mAs

31.999 msec

Focal Spot :

SID : 100

19. Change the exam parameters as appropriate.

CAUTION: If no technical factors are present in the system, the default settings are:

- **kV = 40**
- **ma = 25**
- **mAs = .25**
- **SID = 100cm**
- **Grid = In**

No exposures should be made until the user selects values appropriate for the patient size.

20. Upon completion for each view, click [NEXT TECH] to populate all available techniques.

21. When finished, click [EXAM MENU].

- The Exam Menu appears.

22. Click [SAVE].

- A message appears: "Changes have been made to the Protocol Database. Would you like to save these changes?"

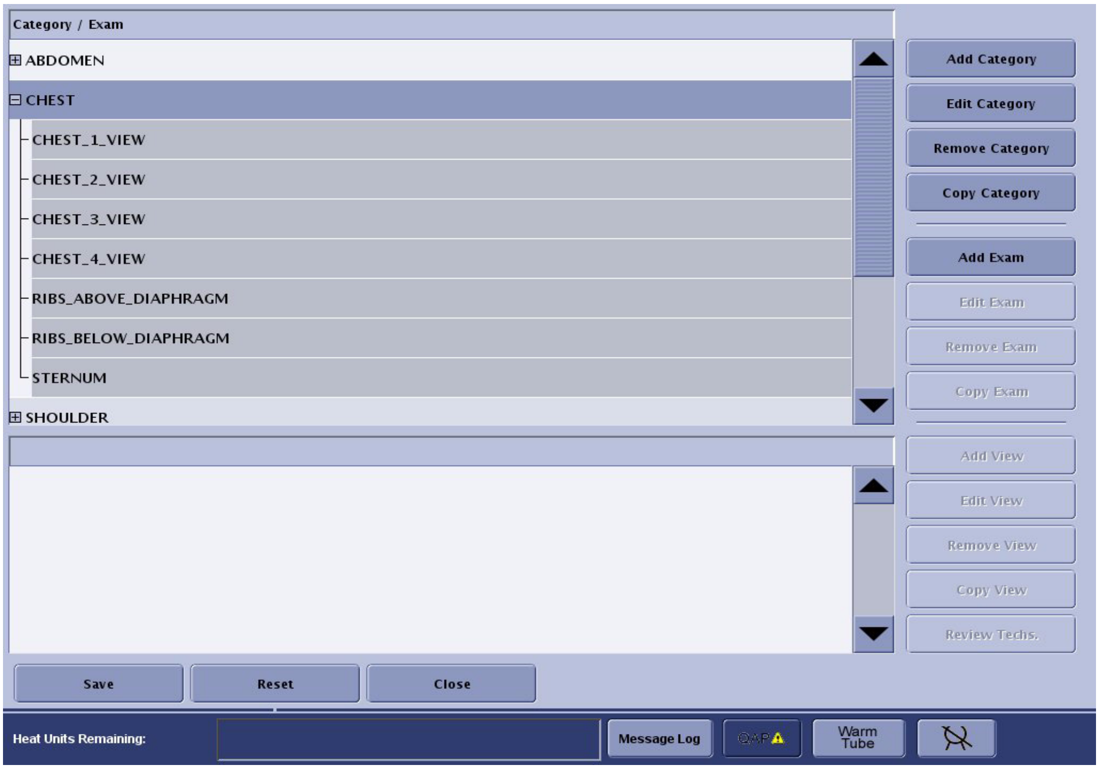
23. Click [YES].
    - The Preferences – Protocols screen appears.
24. Click [CLOSE].
    - A message appears: “Changes have been made to the Protocol Database. Would you like to save these changes?”
25. Click [YES].
    - The Preferences Protocol screen closes and returns you to the Worklist.

Protocol Editor Copy Functions

Follow this process to access the Protocol Database Editor.

1. From the Worklist, select [UTILITIES].
2. Select **Preferences > Protocols**.
3. Click [EDIT].
    - The Exam Menu appears.

Figure 15-34 Exam menu screen


Category / Exam
⊞ ABDOMEN
⊟ CHEST
CHEST_1_VIEW
CHEST_2_VIEW
CHEST_3_VIEW
CHEST_4_VIEW
RIBS_ABOVE_DIAPHRAGM
RIBS_BELOW_DIAPHRAGM
STERNUM
⊞ SHOULDER
Add Category
Edit Category
Remove Category
Copy Category
Add Exam
Edit Exam
Remove Exam
Copy Exam
Add View
Edit View
Remove View
Copy View
Review Techs.
Save
Reset
Close
Heat Units Remaining:
Message Log
QAP
Warm Tube

4. Select the Category, Exam, or View.
5. Click [COPY] for Category, Exam, or View.

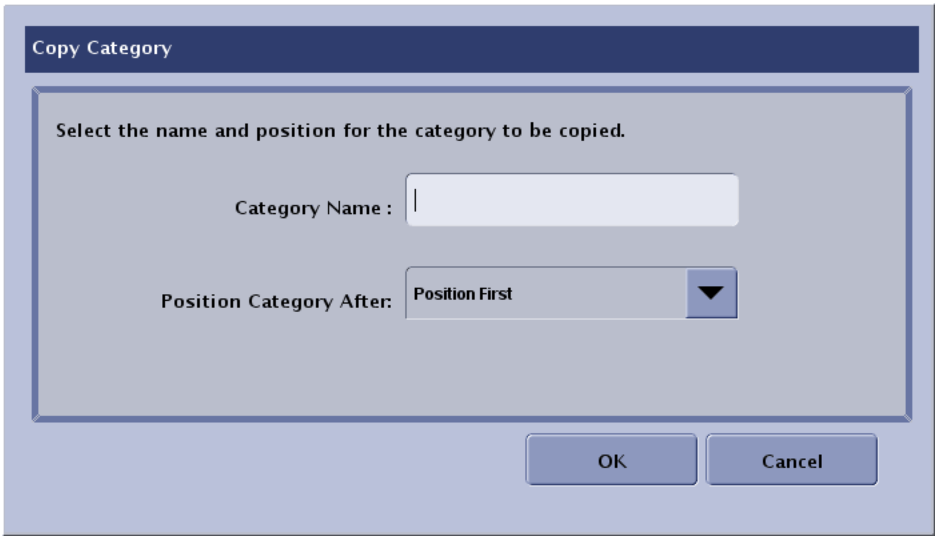
6. Continue with Copy Category, Copy Exam, or Copy View.

Copy Category

1. Enter the new name to use or retype the existing name.

NOTE: If reusing the existing name, be sure to include any underscores in the title.

2. Select the position on the Category list.
3. Click [OK].
4. Continue with Copy Exam.



Copy Category

Select the name and position for the category to be copied.

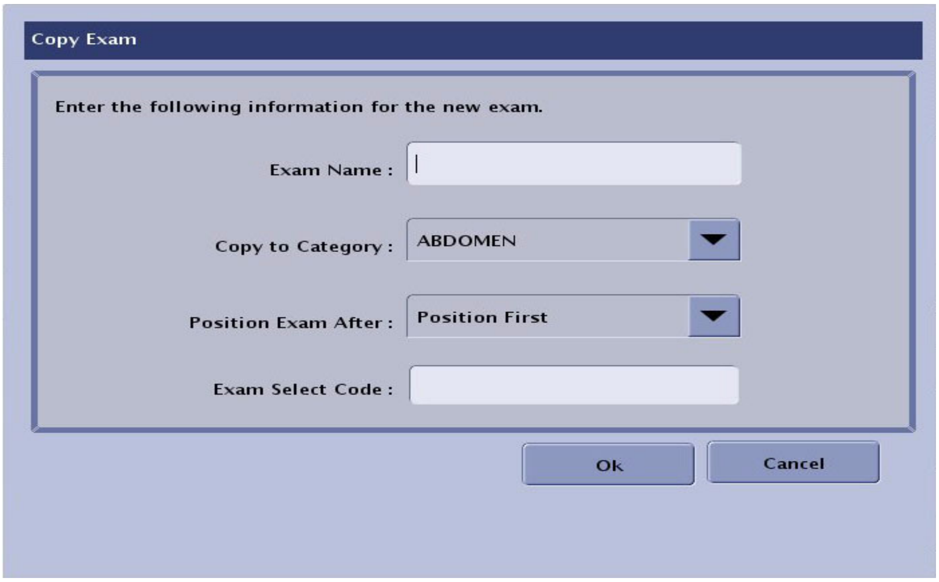
Category Name :

Position Category After: Position First

Copy Exam

1. Enter the new name to use or retype the existing name.
2. Select the Category to copy to.
3. Select the position on the Exam list.
4. Click [OK].

5. Continue with Copy View.



Copy Exam

Enter the following information for the new exam.

Exam Name :

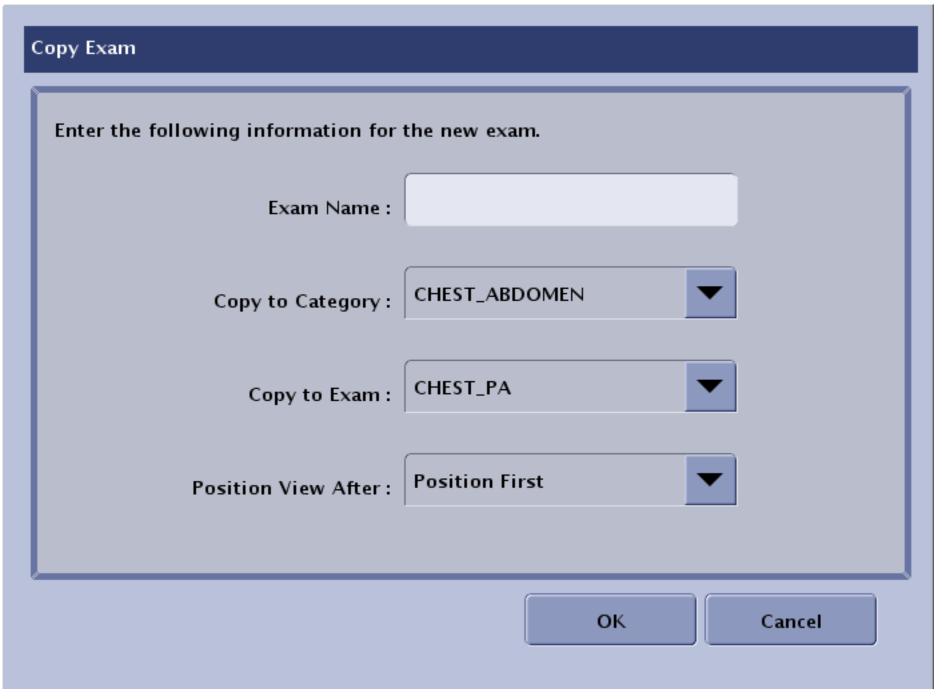
Copy to Category : ABDOMEN

Position Exam After : Position First

Exam Select Code :

Copy View

1. Enter the **Exam Name** to use or retype the existing name.
2. Select the **Copy to Category** from the list.
3. Select the **Copy to Exam** from the list.
4. Select the **Position View** from the list.
5. Click [OK].



Copy Exam

Enter the following information for the new exam.

Exam Name :

Copy to Category : CHEST_ABDOMEN

Copy to Exam : CHEST_PA

Position View After : Position First

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Appendix A

Login Administration

In the effort to provide aid for our customers in complying with the Health Insurance and Portability and Accountability Act (HIPAA), the Enterprise Access Authorization and Audit (EA3) control features have been implemented in this product. It is the facility's responsibility to ensure the proper usage of these features in order to conform to the Privacy Act.

Topics covered include:

- Enabling EA3 Login
- Understanding Local and Enterprise Environments
- Understanding Privileges, Groups, and Users
- Administering Groups and Users
  - Accessing the Login Administration Screens
  - Working with Groups
    - Add Groups
    - Assign Privileges to Groups
    - Remove Groups
    - Show Protected Groups
  - Working with Users
    - Add Users
    - Assign Users to Groups
    - Change User Password
    - Remove Users
    - Show Protected Users
- Viewing the Audit Log

- *Administering System Configuration*
  - *Change Display Settings and Enable Enterprise Authorization*
  - *Configure Enterprise Authorization*
  - *Configure Audit Log*
  - *Use LDAP Console*

Enabling EA3 Login

On the Service User Interface, click on the Configuration Tab and select the Advanced Options. Click on the Radio Buttons available to Enable/ Disable the HIPAA option. By default the HIPAA option is disabled.

The Login feature can be turned on or off by your Field Engineer.

Understanding Local and Enterprise Environments

The login function may be administered at either a local or enterprise level.

Local (or stand-alone) login administration is for a piece of equipment or information system to have its own set of login names and passwords. Each local system needs to have users with admin access set up to administer the login function. From the user's perspective, he or she needs a login name and password for each piece of equipment and information system necessary to perform his or her job.

Enterprise login administration is to use the site's existing login names and passwords to allow access to multiple pieces of equipment and information systems throughout the site. The login function is administered centrally by the site's system administrator because each system sends and receives login information over the network. From the user's perspective, he or she only needs one login name and password to access all equipment and systems necessary to perform his or her job.

For mobile units in an enterprise environment, login information is sent and received only when the unit is connected to the network.

Understanding Privileges, Groups, and Users

Privileges are the rights to access a system or piece of equipment and perform certain functions. Privileges are assigned to groups. The privileges are created by GE and cannot be changed. They are:

- **GEHC Service** allows access to all functions for service and maintenance personnel.

- **Administrator** allows access to the Login administration and Preferences functions in addition to being able to add procedures to the Worklist, conduct exams, and manage images.
- **Standard and Limited User** only allows access to add procedures to the Worklist, conduct exams and manage images.

Groups are categories of users that have certain privileges assigned. Users get their privileges from groups. A user may be assigned to several groups. Groups are created and assigned privileges by a user with GE Service or Administrator access. If you do not have an enterprise system, the assignment of group privileges will probably be limited to those who have administrator privileges and those who don't. If your system is set up for enterprise login, your IT person or administrator will be using more of the features.

When equipment is installed in an enterprise environment, the administrator configures the enterprise groups that the equipment will use. That is, the enterprise environment will have groups for many levels of access and job descriptions, the administrator will set the individual piece of equipment to use a sub-set of those groups.

Users are individuals who have permission to use a particular system. Users are created and assigned to groups by a user with GE Service or Administrator access. These administrators may be IT personnel in an enterprise environment, or a site manager or lead tech in stand-alone environments. The administrator adds new users and assigns the users to a group which dictates the level of privileges a person will have. For example, a person named Sue Smith could belong to a group called technologists, radiologists, administrators, or any combination.

When configuring a system (enterprise or local) always create the groups and assign group privileges first, then add individual users to the groups.

Administering Groups and Users

This section describes how to perform the tasks relating to administering the login function.

Accessing the Login Administration Screens

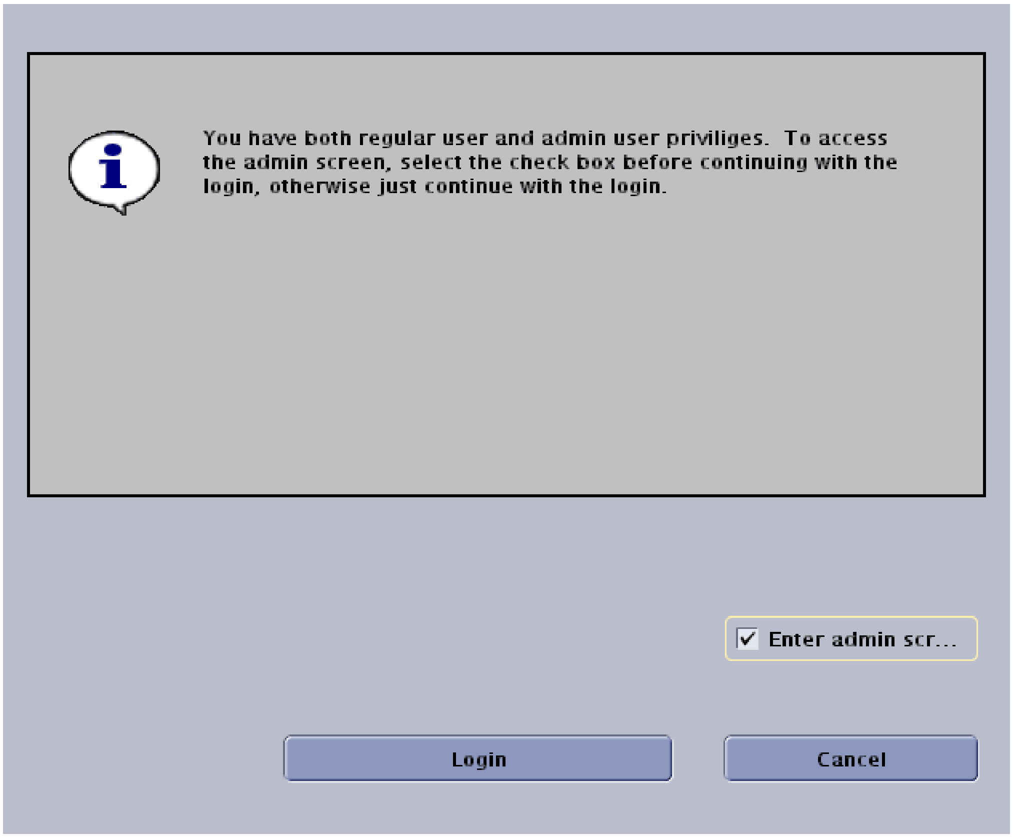
Follow this process to gain access to the login administration screens.

Follow this process to log on to the system.

1. Start up the system or log off the previous user.
   - The Login screen appears.
2. Type in your **Login Name**.
3. Type in your **Password**.

4. Click [LOGIN].
   - If you have administrator access, a message (Figure A-1) appears: “You have both regular user and admin user privileges. To access the admin screen, select the check box before continuing with the login, otherwise just continue with the login.”
   - If the message does not appear, then you do not have access to the login administration functions.
5. Select the **Enter admin screen** checkbox.
6. Click [LOGIN].
   - The Login Administration screen appears.
   - [CANCEL] closes the message and returns you to the main Login screen.
7. Click [EXIT] on the bottom of any login administration screen to return to the standard login screen.

Figure A-1 Administrator access message



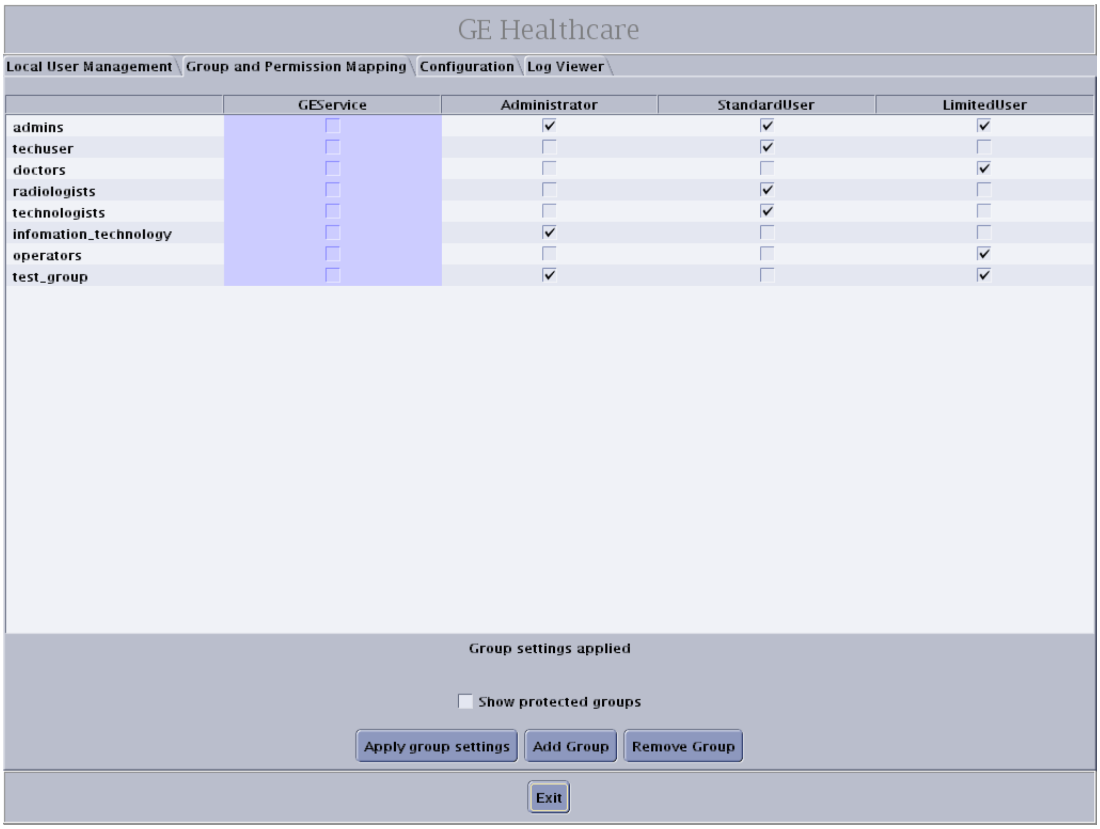
You have both regular user and admin user priviliges. To access the admin screen, select the check box before continuing with the login, otherwise just continue with the login.

☑ Enter admin scr...

Working with Groups

The Group and Permissions Mapping tab (Figure A-2) allows you to add groups, remove groups, and assign privileges to groups. On this screen, the four privileges categories are at the top of the screen (columns) and the group names are at the left edge of the screen (rows).

Figure A-2 Group and Permissions Mapping tab


GE Healthcare
Local User Management
Group and Permission Mapping
Configuration
Log Viewer

	GEService	Administrator	StandardUser	LimitedUser
admins	☐	☑	☑	☑
techuser	☐	☐	☑	☐
doctors	☐	☐	☐	☑
radiologists	☐	☐	☑	☐
technologists	☐	☐	☑	☐
infomation_technology	☐	☑	☐	☐
operators	☐	☐	☐	☑
test_group	☐	☑	☐	☑

Group settings applied

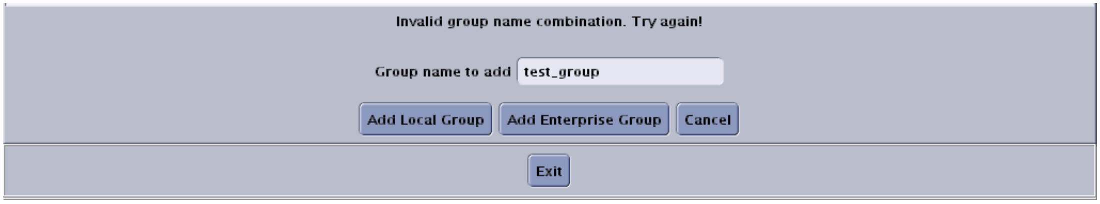
☐ Show protected groups

Apply group settings
Add Group
Remove Group
Exit

Add Groups

1. Select the **Group and Permissions Mapping** tab, if necessary.
2. Click [ADD GROUP].
3. Type a name for the group in the text box that appears near the bottom of the screen (Figure A-3).

Figure A-3 Add group text box



Invalid group name combination. Try again!

Group name to add: test_group

Add Local Group
Add Enterprise Group
Cancel
Exit

NOTE: Remember the following when creating group names:

- Group names cannot have spaces or uppercase (capital) letters. Use all lower-case letters in the group name and use underscores to separate words.
- The group name must be unique. That is, the system will not allow two groups to have the same name.

4. Click [ADD LOCAL GROUP] or [ADD ENTERPRISE GROUP] as appropriate.
   - The new group name is added to the table.
   - If the group name cannot be used you will receive a message that informs you of the problem. Type the correct information and click [SUBMIT] again.

Assign Privileges to Groups

1. Click a group name to select it.
2. Select the checkbox under the privilege heading. Refer to *Understanding Privileges, Groups, and Users* for definitions of privileges.

NOTE: The Service privilege is protected and cannot be selected. Only GE Service personnel can assign a group to the Service privilege.

3. Click on a selected checkbox to remove the privilege.

NOTE: You may select or deselect privileges for multiple groups.

4. Click [APPLY GROUP SETTINGS].
   - A message appears: “Apply group settings.”
5. Click [APPLY NOW].

Remove Groups

1. Click a group name to select it.

NOTE: You are able to only delete one group at a time.

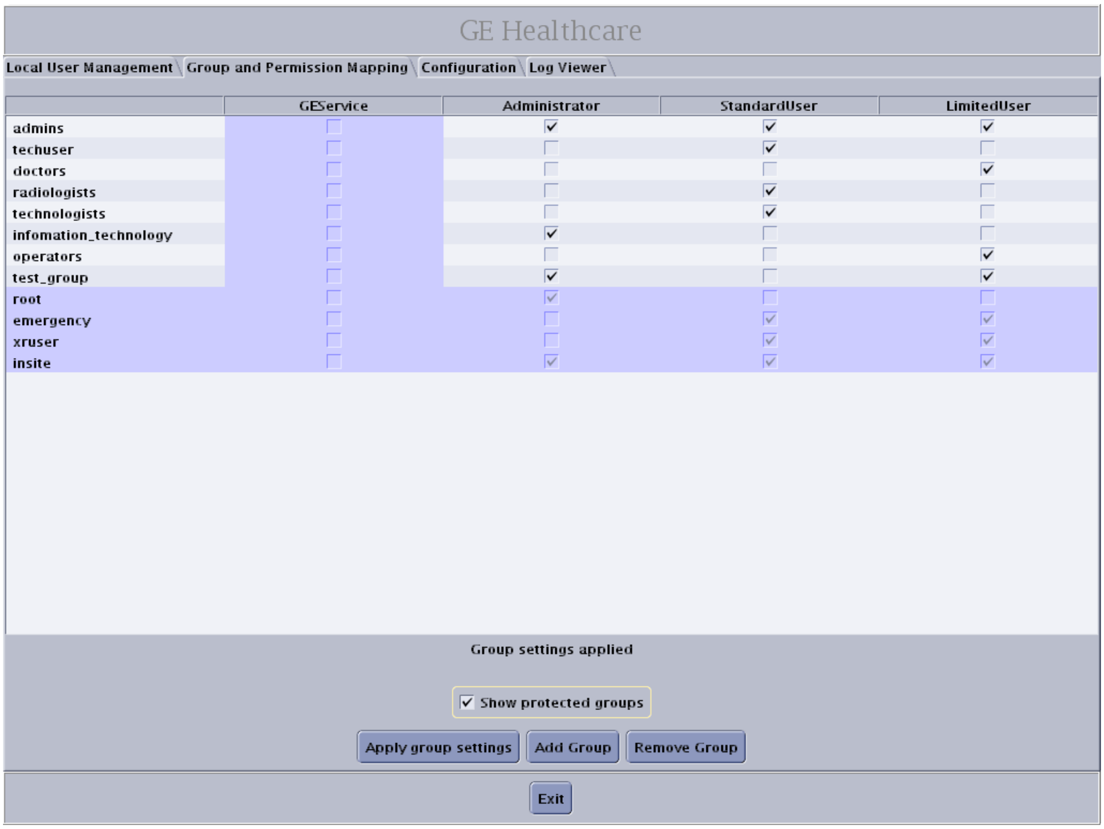
2. Click [REMOVE GROUP].
   - A message appears: “Remove Group xxxx?”
3. Click [REMOVE NOW].

Show Protected Groups

There is a class of groups identified as protected groups. The privileges assigned to these groups can only be modified by a GE Service Engineer.

Select the **Show Protected Groups** checkbox to see these groups. Protected groups and privileges are shown with a violet (light purple) background.

Figure A-4 Protected groups



GE Healthcare
Local User Management
Group and Permission Mapping
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Log Viewer

	GEService	Administrator	StandardUser	LimitedUser
admins	☐	☑	☑	☑
techuser	☐	☐	☑	☐
doctors	☐	☐	☐	☑
radiologists	☐	☐	☑	☐
technologists	☐	☐	☑	☐
infomation_technology	☐	☑	☐	☐
operators	☐	☐	☐	☑
test_group	☐	☑	☐	☑
root	☐	☑	☐	☐
emergency	☐	☐	☑	☑
xruser	☐	☐	☑	☑
insite	☐	☑	☑	☑

Group settings applied

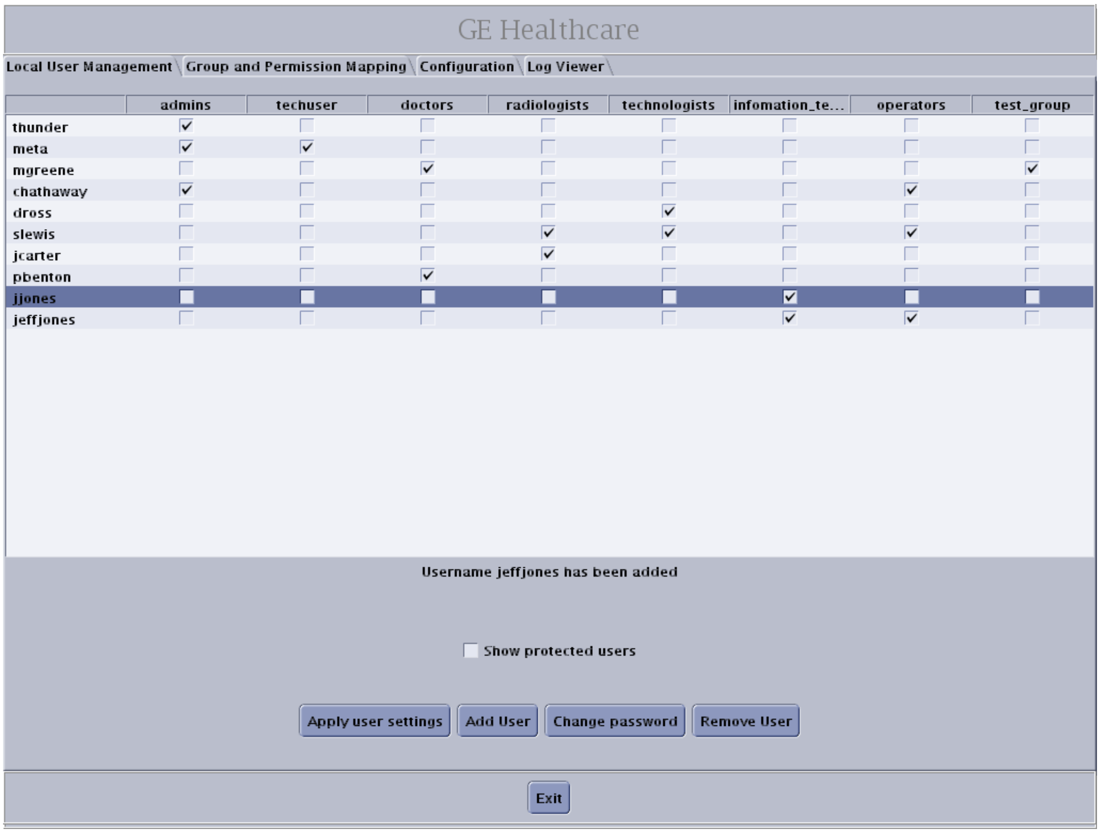
☑ Show protected groups

Apply group settings
Add Group
Remove Group
Exit

Working with Users

The Local User Management tab (Figure A-5) allows you to add users, assign users to groups, change user passwords, and remove users. On this screen, the available groups are at the top of the screen (columns) and the user names are on the left edge of the screen (rows).

Figure A-5 Local User Management tab


GE Healthcare
Local User Management
Group and Permission Mapping
Configuration
Log Viewer
Apply user settings
Add User
Change password
Remove User
Exit

	admins	techuser	doctors	radiologists	technologists	infomation_te...	operators	test_group
thunder	☑	☐	☐	☐	☐	☐	☐	☐
meta	☑	☑	☐	☐	☐	☐	☐	☐
mgreene	☐	☐	☑	☐	☐	☐	☐	☑
chathaway	☑	☐	☐	☐	☐	☐	☑	☐
dross	☐	☐	☐	☐	☑	☐	☐	☐
slewis	☐	☐	☐	☑	☑	☐	☑	☐
jcarter	☐	☐	☐	☑	☐	☐	☐	☐
pbenton	☐	☐	☑	☐	☐	☐	☐	☐
jjones	☐	☐	☐	☐	☐	☑	☐	☐
jeffjones	☐	☐	☐	☐	☐	☑	☑	☐

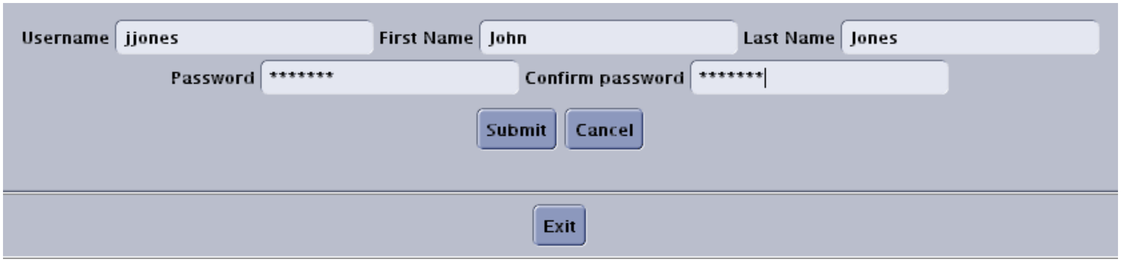
Username jeffjones has been added

☐ Show protected users

Add Users

1. Select the **Local User Management** tab, if necessary.
2. Click [ADD USER].
   - Five text boxes appear near the bottom of the screen (Figure A-6).

Figure A-6 Add user text boxes


Submit
Cancel
Exit

Username: jjones
First Name: John
Last Name: Jones
Password: *******
Confirm password: *******

3. Type a Username.

NOTE: Remember the following when creating user names:

- You cannot use the names “operator”, “admin”, or “administrator.” These names are reserved for use by the system and GE Service personnel.
- User names cannot have spaces or uppercase (capital) letters. Use all lower-case letters in the username and use underscores to separate words.
- User names cannot have special characters: ~!@#%^&*()+=[]{}\|:;’”,.<>/?
- The User name must be unique. That is, the system will not allow two people to have the same user name.

4. Type the user’s First Name.
    - This text box may be left blank but it is recommended that you type a name.

NOTE: Capital letters, spaces, and punctuation are allowed in the First Name and Last Name text boxes.

5. Type the user’s Last Name.
    - This text box may be left blank but it is recommended that you type a name.
6. Type a Password.

NOTE: The default system does not have pre-configured standards for password format or construction; however, your facility may have password standards that must be followed. Ask your facility’s System Administrator about password standards and create passwords that conform to those standards.

7. Re-type the password in the Confirm Password text box.

NOTE: The passwords must match exactly to be accepted.

8. Click [SUBMIT].
    - The new user is added to the table.
    - If the Username cannot be used or if the passwords do not match, you will receive a message that informs you of the problem. Type the correct information and click [SUBMIT] again.

Assign Users to Groups

1. Select the checkbox under the group heading to add the user to that group.
2. Click on a selected checkbox to remove the user from the group.

NOTE: You may select or deselect groups for multiple users.

NOTE: You cannot change the group assignments for protected users.

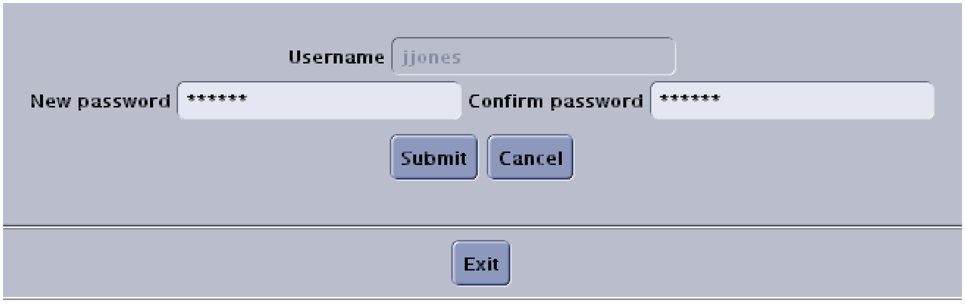
3. Click [APPLY USER SETTINGS].

Change User Password

You cannot see user's passwords for security reasons. In the event of a forgotten password, you may change the password and then tell the user the new password.

1. Click a user name to select it.
2. Click [CHANGE PASSWORD].
   - The Password and Change Password text boxes appear.

Figure A-7 Change password



Username jjones

New password ******

Confirm password ******

3. Type a password into the New Password field.

NOTE: The default system does not have pre-configured standards for password format or construction; however, your facility may have password standards that must be followed. Ask your facility's System Administrator about password standards and create passwords that conform to those standards.

4. Re-type the password into the Confirm Password field.
5. Click [SUBMIT].

Remove Users

1. Click a user name to select it.

NOTE: You cannot delete protected users.

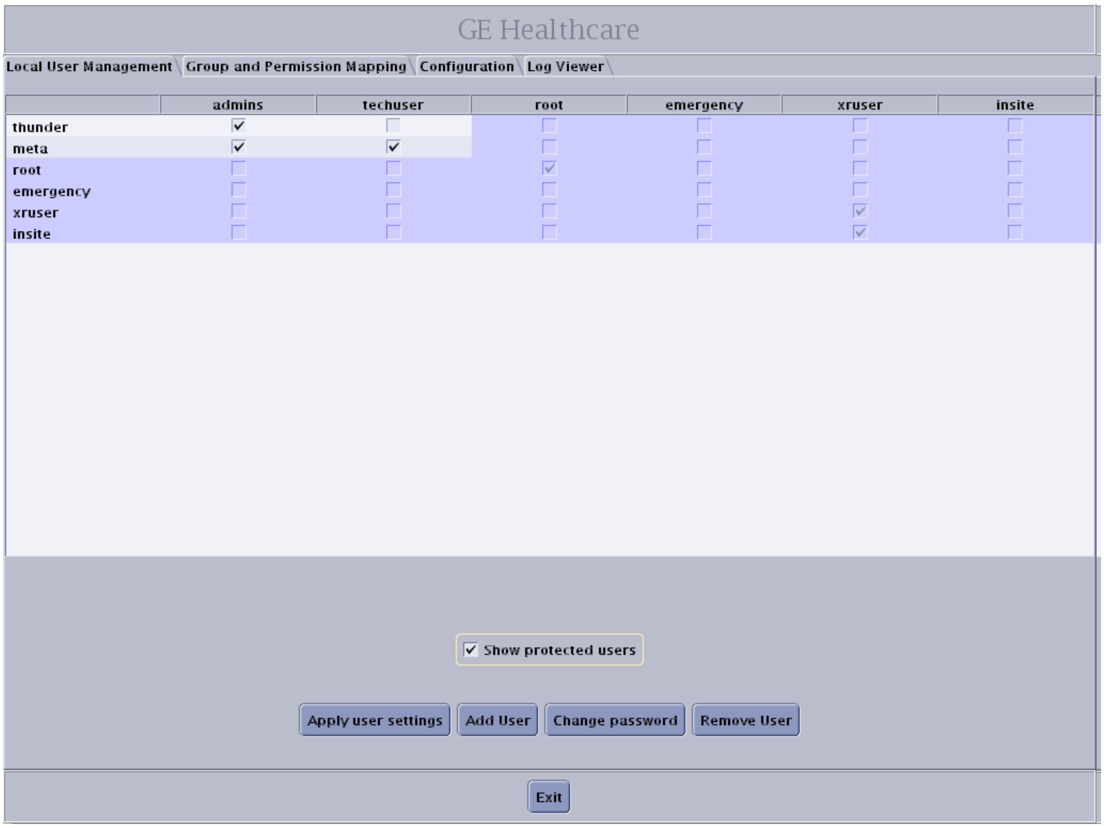
2. Click [REMOVE GROUP].
   - A message appears: "Remove User xxx?"
3. Click [REMOVE NOW].

Show Protected Users

There is a class of users identified as protected users. The privileges assigned to these users can only be modified by a GE Service Engineer.

Select the **Show Protected Users** checkbox to see these users. Protected users and groups are shown with a violet (light purple) background.

Figure A-8 Protected users


GE Healthcare
Local User Management
Group and Permission Mapping
Configuration
Log Viewer

	admins	techuser	root	emergency	xruser	insite
thunder	☑	☐	☐	☐	☐	☐
meta	☑	☑	☐	☐	☐	☐
root	☐	☐	☑	☐	☐	☐
emergency	☐	☐	☐	☐	☐	☐
xruser	☐	☐	☐	☐	☑	☐
insite	☐	☐	☐	☐	☑	☐

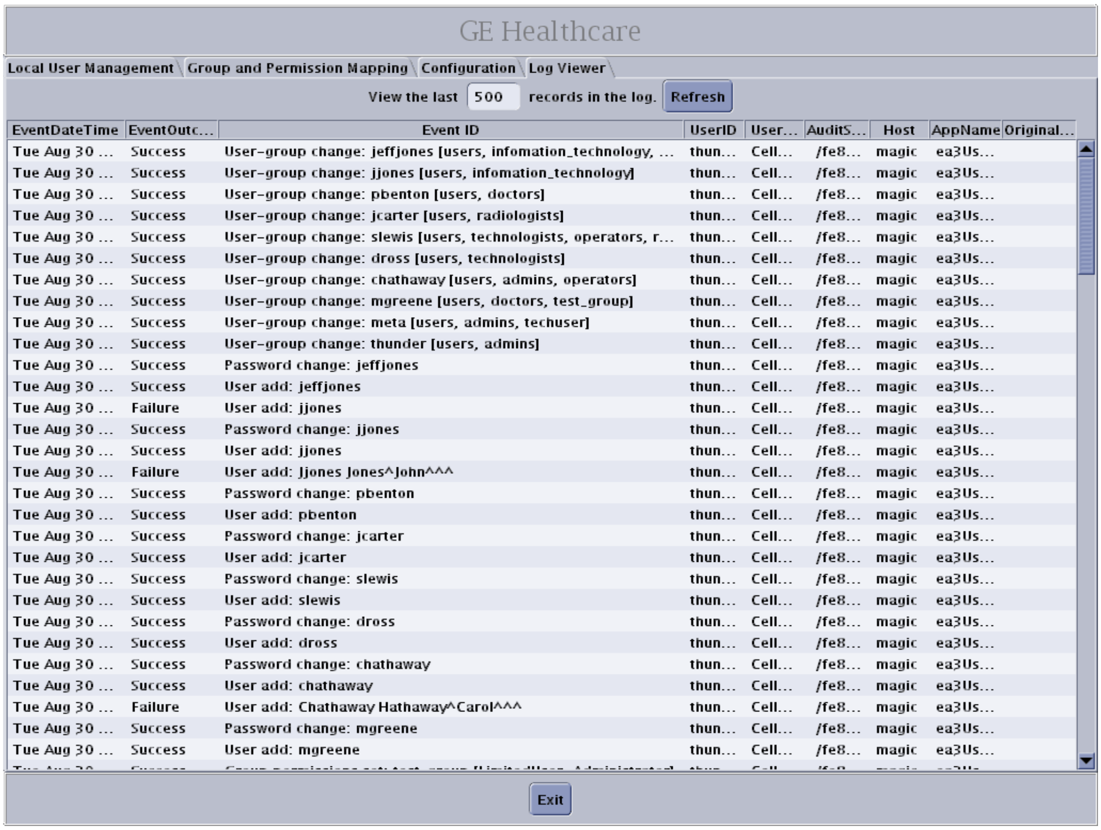
☑ Show protected users

Apply user settings
Add User
Change password
Remove User
Exit

Viewing the Audit Log

The audit log provides information about who has accessed the system, when the system has been accessed, and the type of login (that is, emergency logins). The log settings are configured through the Configuration-Audit Log tab. Refer to Configure Audit Log for more information.

Figure A-9 Log Viewer tab



View the last 500 records in the log.

EventDateTime	EventOutc...	Event ID	UserID	User...	AuditS...	Host	AppName	Original...
Tue Aug 30 ...	Success	User-group change: jeffjones [users, infomation_technology, ...	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: jjones [users, infomation_technology]	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: pbenton [users, doctors]	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: jcarter [users, radiologists]	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: slewis [users, technologists, operators, r...	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: dross [users, technologists]	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: chathaway [users, admins, operators]	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: mgreene [users, doctors, test_group]	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: meta [users, admins, techuser]	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User-group change: thunder [users, admins]	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	Password change: jeffjones	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User add: jeffjones	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Failure	User add: jjones	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	Password change: jjones	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User add: jjones	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Failure	User add: Jjones Jones^John^^^	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	Password change: pbenton	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User add: pbenton	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	Password change: jcarter	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User add: jcarter	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	Password change: slewis	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User add: slewis	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	Password change: dross	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User add: dross	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	Password change: chathaway	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User add: chathaway	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Failure	User add: Chathaway Hathaway^Carol^^^	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	Password change: mgreene	thun...	Cell...	/fe8...	magic	ea3Us...	
Tue Aug 30 ...	Success	User add: mgreene	thun...	Cell...	/fe8...	magic	ea3Us...	

Administering System Configuration

The Configuration tab (Figure A-10)allows you to perform several tasks that effect how the login function works.

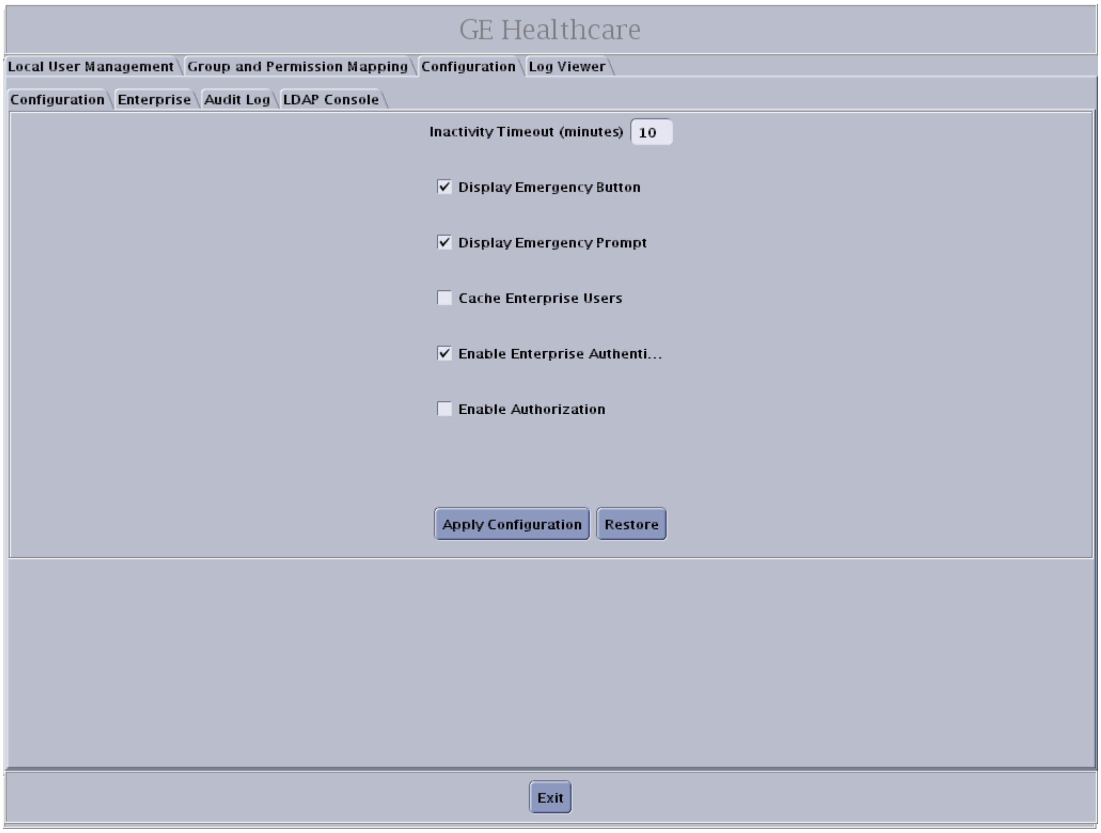
When the Configuration tab is selected, another row of tabs appears. The following sections describe the controls available for each tab.

Change Display Settings and Enable Enterprise Authorization

The Configuration-Configuration tab (Figure A-10) allows you to set the inactivity timeout period, control whether the Emergency Login button appears, and to enable enterprise authorization.

Table A-1 describes each function.

Figure A-10 Configuration-Configuration tab


GE Healthcare
Local User Management
Group and Permission Mapping
Configuration
Log Viewer
Configuration
Enterprise
Audit Log
LDAP Console
Apply Configuration
Restore
Exit

Inactivity Timeout (minutes) 10

☑ Display Emergency Button

☑ Display Emergency Prompt

☐ Cache Enterprise Users

☑ Enable Enterprise Authenti...

☐ Enable Authorization

Table A-1 Configuration function descriptions

Function	Description
Inactivity timeout	Sets the number of minutes before automatic logout will occur. For example, if you enter 10 minutes, the system will display the splash screen after 10 minutes of inactivity (no keyboard entry or mouse movements), requiring the user to log in. When logging back in, the system is returned to its last know state. To disable inactivity timeout, enter "0".
Display Emergency Button	Allows the Emergency Login button to be shown on the Login screen. If this button is not displayed, only those users with a valid account can log onto the system.
Display Emergency Prompt	When the [EMERGENCY LOGON] button is clicked, displays a prompt that requires emergency users enter their names.
Cache Enterprise Users	Allows all users previously set up on the system to log in even if the site network is down.
Enable Enterprise Authentication	Verifies users and what privileges they have based on the network settings at your site.
Enable Authorization	For facilities with enterprise login, enables checking group membership before allowing users to enter the system. With authorization, you must add user groups to the group tab in order to let people log in.
[APPLY CONFIGURATION]	Applies the settings.
[RESTORE]	Restores the setting to the last applied configuration. That is, when the [APPLY CONFIGURATION] button was last clicked.

Configure Enterprise Authorization

The Configure-Enterprise Tab is used by the site's IT (Information Technology) or GE Service personnel. It provides connectivity to the site's user database. If you do not have a network established in your facility, this tab will not be used.

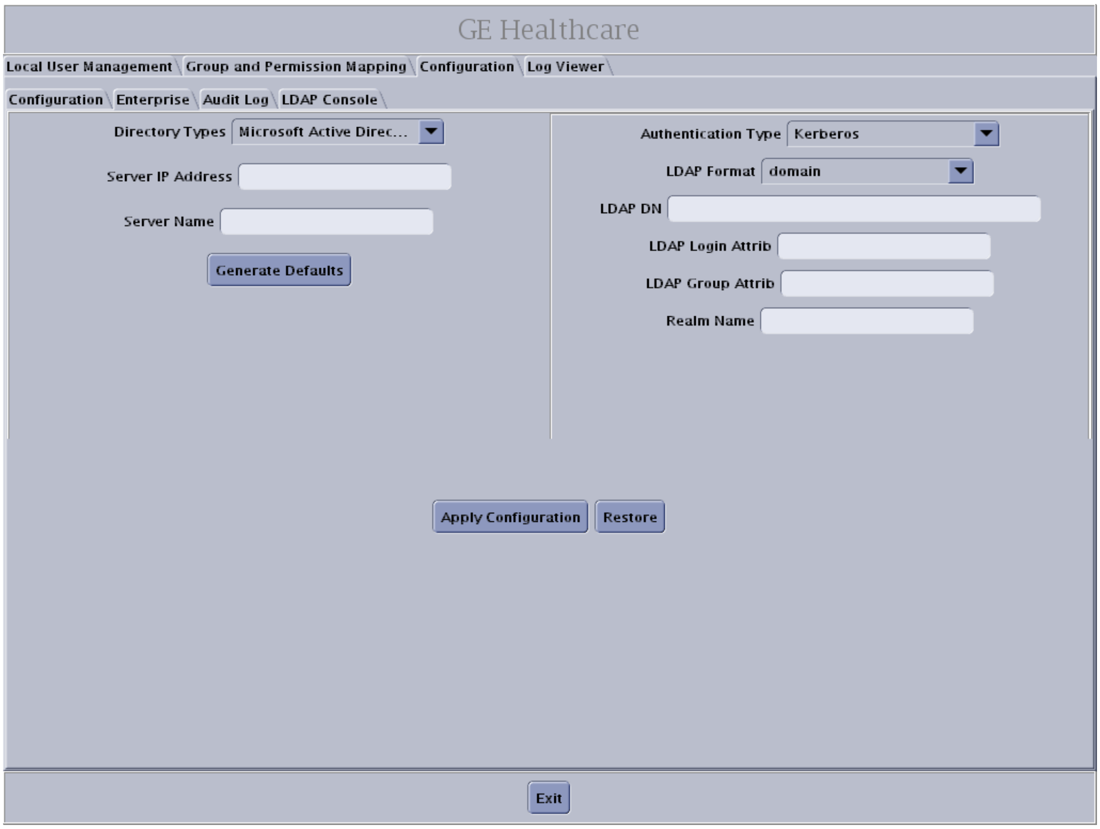
When the fields on the left side of the screen are completed, the fields on the right side auto-populate with suggested defaults.

To change the defaults, deselect the Use default settings checkbox and modify the information as appropriate.

Click [APPLY CONFIGURATION] to apply the settings.

The [RESTORE] button resets the tab to the last saved settings.

Figure A-11 Configuration-Enterprise tab



GE Healthcare
Local User Management
Group and Permission Mapping
Configuration
Log Viewer
Configuration
Enterprise
Audit Log
LDAP Console
Server IP Address
Server Name
Generate Defaults
LDAP DN
LDAP Login Attrib
LDAP Group Attrib
Realm Name
Apply Configuration
Restore
Exit

Directory Types: Microsoft Active Direc...

Authentication Type: Kerberos

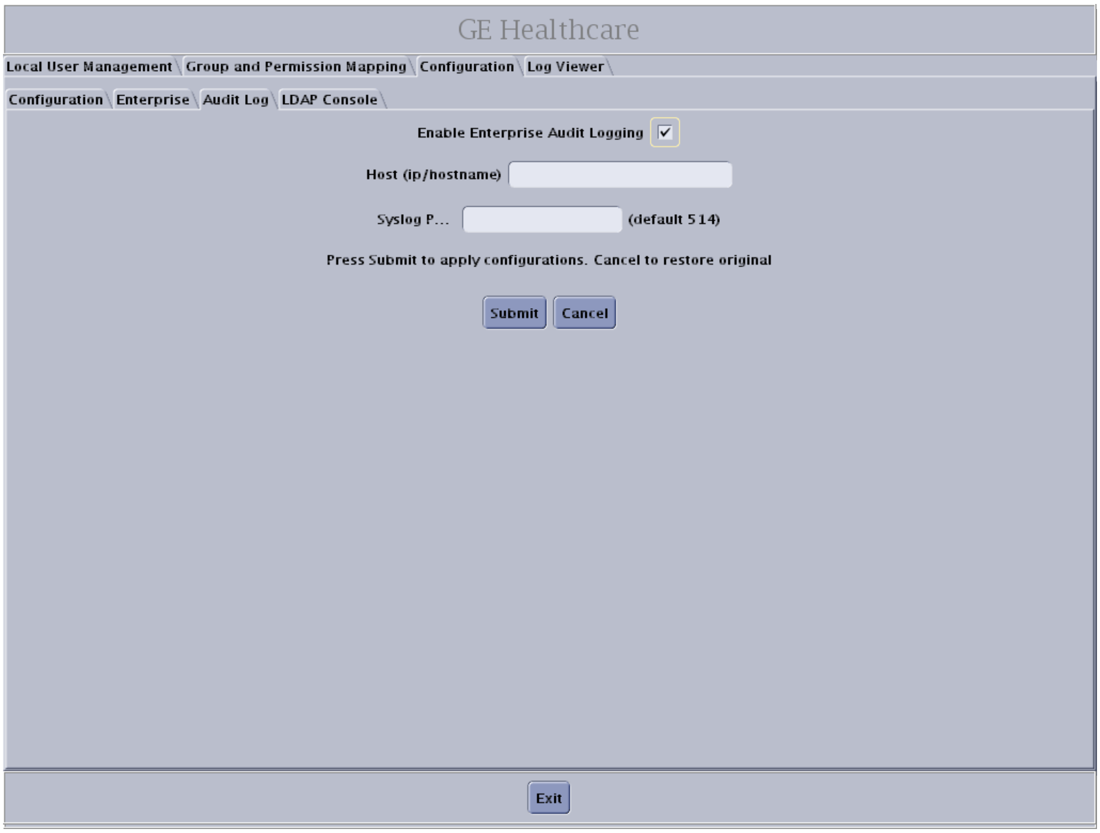
LDAP Format: domain

Configure Audit Log

If enterprise authorization is enabled, this tab controls if audit logging is to be enables, which hosts will be tracked, and the number of events to track.

Click [SUBMIT] to apply the settings.

Figure A-12 Configuration -Audit Log tab


GE Healthcare
Local User Management
Group and Permission Mapping
Configuration
Log Viewer
Configuration
Enterprise
Audit Log
LDAP Console
Submit
Cancel
Exit

Enable Enterprise Audit Logging ☑

Host (ip/hostname)

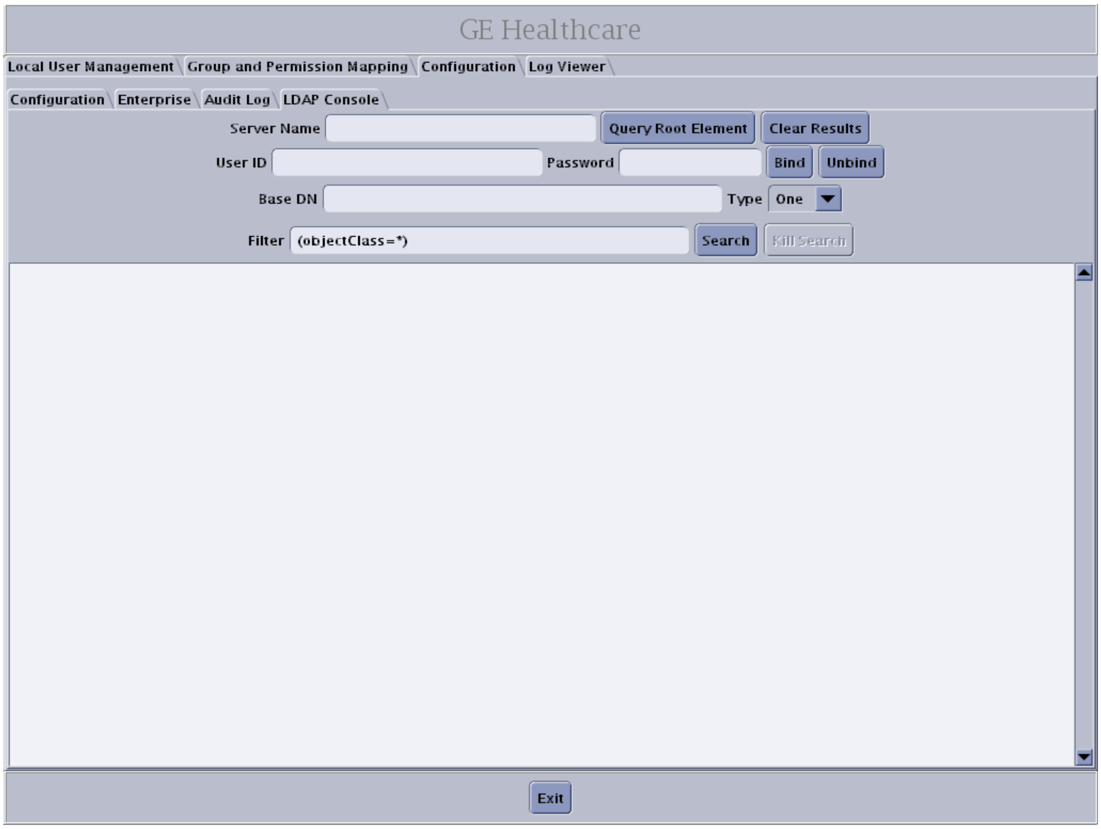
Syslog P... (default 514)

Press Submit to apply configurations. Cancel to restore original

Use LDAP Console

Lightweight Directory Access Protocol (LDAP) functions are available from the Configuration-LDAP Console tab.

Figure A-13 Configuration-LDAP Console table


GE Healthcare
Local User Management
Group and Permission Mapping
Configuration
Log Viewer
Configuration
Enterprise
Audit Log
LDAP Console
Server Name
Query Root Element
Clear Results
User ID
Password
Bind
Unbind
Base DN
Type
Search
Kill Search
Exit

Filter (objectClass=*)

Type One

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Appendix B

Specification List

- X-ray Tube
  - X-ray heat capacity: 350 khu
  - Focal spot of X-ray tube: 0.6 mm / 1.25 mm (1.31EC)
  - Types of X-ray tube: Anode rotation
  - Nominal Anode Power:
- Storage conditions
  - Environment temperature: -20~70°C (The environment temperature of digital detector is +0°C ~ +50°C, and monitor is -30°C ~ +60°C)
  - Relative humidity: ≤90%
- Operating conditions
  - Ambient operating conditions
    - ➢ Environment temperature: 10 ~ 30°
    - ➢ Relative humidity: 30 ~ 80%
    - ➢ Atmospheric pressure: 700 ~ 1062 hPa
  - Power supply conditions
    - ➢ Power voltage: 380V ± 10%
    - ➢ Frequency: 50Hz ± 1Hz
    - ➢ Impedance: ≤ 0.10 Ω
    - ➢ Input current: 45 A (steady), 495 A (instantaneous)
- Power output

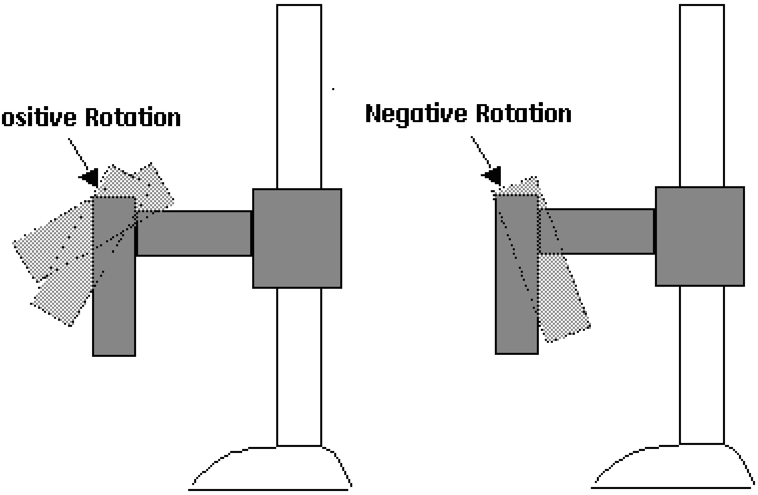
  80kw/65kw (configurable)

    - ➢ Max output:
      80 kW (1000mA@80kv);
      65 kW (500mA@130kv)

        - ➢ Nominal output:
          80 kW (800mA@100kV, 0.1s);
          63 kW (630mA@100kV, 0.1s)
- X-ray tube voltage range and the allowable deviation:
    - Digital adjustment: 40 ~ 150 kW, minimum increment 1kV
    - Allowable deviation: ≤ 10
- X-ray tube current range and the allowable deviation:
    - Current range:
      80 kW: 10 ~ 1000 mA, totally 21 steps;
      65 kW: 10 ~ 800 mA, totally 20 steps
    - Allowable deviation: ≤ 20%
- Time of exposure
    - X-ray tube exposure time range: 2.0 ms ~ 2 s
    - Allowable deviation: ≤ (10% ± 1ms)
- X-ray tube current time product range and the allowable deviation
    - Digital steps adjustment: 0.25 mAs ~ 630 mAs
    - Allowable deviation: ≤ (10% + 0.2mAs)
- Accuracy of DAP indicator: ± 30%
- Length (SID)
  Deviation between test data and indicating data is in ± 2 %
- Radiographic stretcher table
    - Max capacity of weight: 220kg
    - Motorization: ≥ 200N
- Digital wall stand
    - Noise

      Operating under the non-loading condition, ≤ 70 dBA (not including the non-linear or periodic noises in 2 seconds)
    - Digital detector
        - ➢ Longitudinal movement range along column: 1500mm ± 10mm

- ➢ Negative rotation movement range: -20° ~ 0°, ± 2°
  Positive rotation movement range: 0° ~ 90°, ± 2°



- – Loading weight

  Digital detector (non-patient loading system) in the horizontal location, the weight (loading) capacity should be ≥ 30 kg,and the digital detector should keep in balance without descending

- OTS
  - – Noise:

    During OTS movement, the noise should be the non-linear or periodic noises in ≤ 70dBA (excluding 3s)

  - – Movment
    - ➢ X-ray tube longitudinal movement range: ≥ 1490mm ± 10mm
    - ➢ X-ray tube rotation range: ≥ -180° ~ +135°
    - ➢ Longitudinal (bridge) movement configurable
      3 m bridge: ≥ 1856 mm
      2 m bridge: ≥ 856 mm
    - ➢ Lateral (rail) movement: ≥ 2805mm
  - – Holding force

    The resistance of holding force from every direction should be ≥ 100 N (except the vertical direction is the balanced set)

- Digital table
  - – Weight capacity and holding force
    - ➢ Max table top weight capacity: 220 kg
    - ➢ Table top floating holding force: ≥ 200 N
  - – The movement of the table top and the digital detector

- ➢ Table top floating distance
  Long axisdirection: ≥ 670 mm
  Short axis direction: ≥ 210 mm
- ➢ Table top elevating range: 300 mm ± 10 mm
- ➢ The max range of digital detector tracking the OTS longitudinally: ≥ 670 mm

– Noise

Noise should be ≤ 70 dBA when the table eleavting and the flat detector track the OTS.

Appendix C

Glossary of Terms and Acronyms

This appendix defines the X-ray terms necessary for a working understanding of your system. We could in no way list all terms associated with X-ray as it relates to GE equipment, but choose to include a few that may prove helpful when using this guide. This glossary also provides the identification of the various acronyms used in this guide. The phrase is written out in full, followed by the acronym enclosed in parentheses.

A

Active Exam: An open exam whose images are currently displayed.

Active Screen: The screen whose title bar is highlighted.

Alert Box: A box that appears on the screen to give a warning or to report an error message. Also see Dialog Box.

Amorphous Silicon Array: The array of pixels which generate image data which has been deposited on the glass substrate. The Amorphous Silicon Array is created through a Vapor Deposition process (PECVD Plasma Enhanced Chemical Vapor Deposition).

Application Program: A program that performs a specific task. Also called an application.

Arrow Keys: The four directional keys in the lower-right corner of the keyboard.

AWS: See Acquisition Workstation.

B

Basic Grayscale Print SCU: A DICOM term meaning the system can print an image.

Button: A push-button-like image that can appear in screens, dialog boxes or anywhere on screen. Buttons are used to perform actions, confirm requests, etc.

C

Cancel Button: A button which appears in a dialog box. Clicking it cancels the command.

Caps Lock Key: A key which causes subsequently typed letters to appear in uppercase. It does not affect numbers and other non-letter symbols.

Case-Sensitive: A term applied to fields or tasks which are able to distinguish between uppercase characters and lowercase characters. For example, the password and filter fields are case-sensitive.

Cesium Iodide: A scintillator material that converts X-rays to light.

Check Box: Check boxes are used to select one or more items. Placing the mouse over the check box and clicking once places an “x” or a check mark inside the box. To uncheck a box, click once on the “x” or check mark.

Click: To position the mouse pointer (cursor) on an item and then press and quickly release the mouse button.

Close: To shut or minimize a screen by choosing the Close command.

Cobb angle: The angle formed by projecting the ends of two non intersecting lines until they do intersect.

Configuration: The total combination of components making up a computer system.

Configure: To change software or hardware actions by changing settings.

Cursor: A symbol displayed on the screen marking where the next action takes effect or where the next typed character appears. Also used to describe the mouse pointer.

Cut: To remove an item by placing it onto the clipboard by selecting the item and then choosing Cut from a menu.

D

DAP: Dose Area Product. The entrance dose estimate multiplied by the field-of-view area at the corresponding distance from receptor.

Data: Information; especially information used or manipulated by a computer program.

Database: A collection of information organized in a form that can be readily accessed, manipulated, and sorted on a computer network.

Database Management System: A software system for organizing, storing, retrieving, analyzing, and modifying information in a database.

Default: A value, action, or setting a computer system uses unless you override or change it.

Delete: To remove an item, such as a character or word from a file, or a file from a disk.

Detective Quantum Efficiency (DQE): DQE measures the efficiency of the transfer of both the signal and noise. This measure is most representative of Flat Panel Digital Detector image quality with regard to the observer’s ability to detect objects of interest in the image.

DICOM: Digital Imaging COmmunications in Medicine is a standard which is a framework for medical imaging communication.

Disabled: A menu item or menu that cannot be chosen; the menu item or menu title appears dimmed. A disabled item in a dialog or alert box has no effect when clicked.

Display: A general term to describe what you see on the screen of your monitor.

Double-Click: (n.) Two clicks in quick succession, interpreted as a single command. The action of a double-click is different from a single-click.

Drag: To position the pointer on an item, press the mouse button, move the mouse pointer to where you would like the item, and release the mouse button.

Drop-Down List: A drop-down list is a hidden menu that appears when you click an arrow, button or menu title.

DQE: See Detective Quantum Efficiency.

Dynamic Range: The range of exposures over which the panel generates a signal. This range of exposures is large and is displayed in 14bits, that is, 16383 shades of gray, which gives the ability to display a wide latitude image.

E

Edit: To change or modify.

Enter Key: A key causing the cursor or insertion point to move to the beginning of the next line. It’s also used to confirm a command or complete actions.

Error Message: A message displayed to tell you of an error or problem in a program or in your system.

Exam: A group of individual images and/or image groups for a patient.

F

Field: A space where you enter text.

File: A single document, record, application program or other discrete unit of information which is stored on a computer.

Filename: The name that identifies a file.

Folder: A holder of documents, applications, and even other folders. Folders allow you to organize information.

Font: A complete set of characters in one design, size, and style.

G

Glass Substrate: A piece of glass (the base) on which a flat panel detector is built. A detector may have a single glass substrate or several tiled together to create a large panel.

Gray Scale: Shades of gray on the screen created by varying the intensity of the screen's pixels.

H

Hard Copy: Information printed on paper or film, as opposed to being stored on disk or in a storage device.

Hardware: The computer and the machines attached to it.

Highlight: To make something visually distinct, usually by inverting the display. When you select items on screen, they are usually highlighted in some way.

HIS: Hospital Information System.

I

Icon: An image that graphically represents an object, a concept, or a message. Icons are often combined with buttons (a button with a picture on it instead of text).

Image Group: A collection of images for a patient acquired using the same procedure.

Invert Grey Scale: To change bright pixels of an image to dark and dark pixels to bright while maintaining the inter-pixel brightness relationship.

K

Keyboard Shortcut: A keystroke you can use instead of a mouse action to perform a task. Usually a combination of the Alt key and another key, used to invoke a menu item from the keyboard.

L

Limiting Spatial Resolution (LSR): The spatial frequency at which an observer can no longer see a high contrast, structured periodic test pattern under favorable test conditions such as no scatter, no effect of focal spot prenumbra, and high dose.

Looks (image processing): The way an image is processed to be viewed by a radiologist for interpretation.

Log In: To gain access to the system by entering your login name and your password.

LSR: See Limiting Spatial Resolution.

M

Menu: A list of choices presented by a program, from which you can select an action.

Modality Worklist SCU: A DICOM term meaning the system can get scheduled procedures from a RIS system.

Modulation Transfer Function (MTF): Measures the resolution of a system in idealized conditions (no noise, high contrast objects). MTF, by itself, is not representative of the ability of a system to detect objects since it does not include the effect of noise.

Mouse: A small device that controls a pointer (cursor) on the screen The way you move the mouse controls the way the pointer moves on the screen. You use the pointer to select operations, to move data, and to draw with in graphics programs.

MPPS: Multiple Patient Procedure Series. When configured for MPPS, the System sends information like which exam is in progress, when a Study is completed, how many images were acquired, and the radiation dose.

MTF: See Modulation Transfer Function.

N

Network: A collection of interconnected, individually controlled computers, together with the hardware and software used to connect them. A network allows you to share data and peripheral devices and to exchange electronic mail.

O

Offline: (adj.) Not currently connected to or under the control of the computer.

Online: (adj.) Currently connected to and under the control of the computer.

Open: To make available. A file may not be read from or written to until it is open. You can usually open an application or file by double-clicking on its icon.

Open Exam: An exam selected and opened using the worklist or radiology history browsers and not yet closed.

P

Password: A secret, unique word or set of characters that must be entered before you can access an application.

Paste: To place the contents of the Clipboard at the insertion point.

Pixel Pitch: The center to center distance between adjacent pixels on a detector.

Pointer: A small shape on the screen (usually an arrow) that follows the movement of the mouse or shows where your next action takes place. Also called a cursor.

Position: The portion of the image plate exposed for the exam.

Press: To touch a key on the keyboard to activate a function.

Prompt: A message on the screen that tells you of a need for response or action.

Q

Query/Retrieve SCU: A DICOM term meaning the system can query a remote data base and retrieve images.

QAP: A periodic inspection program established to assure continued performance of the GE Portable DR Detector.

R

Read Out Electronics: Electronics attached to the flat panel detector that scans the panel and converts the electrical signal at each pixel into a digital stream which is sent to the computer.

Remote Clinical Review Station: Used by Physicians and ancillary personnel for quick review/display of images. Usually a 1K x 1K monitor.

Remote Diagnostic Review Station: Used by the Radiologist to make a diagnosis. Usually made up of two to four 2k x 2K monitors.

Resolution: The number of shades of gray that can captured by the detector (flat panels usually about 12-14 bits).

RIS: Radiology Information System.

S

Save: To store information by transferring it from main memory to a disk.

Screen: An area displaying information on a desktop.

Scintillator: Absorber material layered on top of the Amorphous Silicon Array. The scintillator converts X-ray photons into light photons.

SCP: A DICOM term for Service Class Provider.

Scroll: (1) To move a worklist or other display in its screen so a different part of it is visible. (2) To move all the text on the screen upward or downward, right, and left.

Scroll Button: An arrow at either end of a scroll bar.

Scroll Bar/Slider: A rectangular bar that may be along the right or bottom of a screen used to navigate around the screen.

SCU: A DICOM term for Service Class User.

Selenium: A material used in combination with an amorphous silicon array that converts X-ray photons directly into electronic signals. Not used by GE.

Series: The images from an exam may be broken down into “Series”. A series may consist of multiple image groups (e.g.: one series with multiple echo times may be broken into image groups by echo time). Series can also contain only a single image group.

Shared File Server: A file system allowing multiple users to have access to its data.

SID: Source to Image Distance.

Signal to Noise Ratio (SNR): This represents the amount of useful image information (signal) compared to non-useful information (noise).

SNR: See Signal to Noise Ratio.

Software: A collective term for programs.

Storage Commitment SCU: A DICOM term meaning the system can get confirmation of storage from an archive system.

System Administrator: The person responsible for maintaining the patient database and central storage unit; ensuring system security; and assigning passwords and access privileges. Remote facilities may not have an on-site System Administrator.

T

Teleradiology: Technology by which digitized medical diagnostic images and related information are transmitted from one location to another. Also referred to as "Telerad".

Text Box: The place or places in any dialog box where you can type information.

Tiling: Attaching several small detectors together to form one large flat panel detector. This is sometimes referred to as stitched together.

Tool Palette: A collection of tool buttons that lets you change the way an image appears on the screen. Appears in the View tab only.

U

Uniformity: Uniform brightness from edge to edge. Uniform resolution and no geometric distortion.

User: A person operating or controlling a computer system.

User Interface: A user input/output device for the system. The rules and conventions by which a computer system communicates with the person operating it.

Utility: In general, an application program performing a relatively simple function or set of functions.

W

Window/Level Adjustment: Changing the contrast and brightness of an image.

Worklist: A listing of exams from which you can select. The Worklist menu enables you to choose the list you want to display.

Workstation: A computer you use to do your work and send or receive information over a network. It is also used to do advanced processing. It is usually located remotely and may have 1K or 2K monitors.

Appendix D

Revision History and List of Effected Pages

Revision History

Revision	Date	Reason
1	2007/11/30	Initial release.

List of Effected Pages

Pages	Revision	Pages	Revision	Pages	Revision